The Matrix – Post Cluster Innovation Policy

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Innehåll

1 Cluster collaboration and glocalised value creation by Arne Eriksson

1.1 Internationalisation of clusters – relevant policy issues for VINNOVA

This report documents and presents a synthesis of five workshops arranged by VINNOVA at the beginning of 2009. The stated purpose was to address policy issues concerning internationalisation of clusters and innovation systems. The workshops were an outflow of a review of this topic that was made by Arne Eriksson on behalf of VINNOVA last year. One backdrop to the study was the fact that internationalisation – cluster collaboration – seems to be emerging as a policy issue in the EU and elsewhere without much analysis of the rationale for cluster collaboration in the sense that it is not new for firms to work internationally or for researchers to do so. Even cluster organisations collaborate internationally in the InnoNet framework as one example. The review indicated that there seems to be a difference of emphasis between researchers and practitioners as regards the rationale for cluster collaboration. Market access was the most cited reason according to a study of 51 clusters in several countries. Hence, one could argue that policy should support marketing, branding and market-oriented collaboration. Among researchers internationalisation seems to be discussed in terms of knowledge dynamics and new ways to understand proximity. Then relations to leading knowledge hubs and high absorptive capacity by having local knowledge gatekeepers and strong links within clusters come to the fore. So, the perceptions of why cluster collaboration is more needed than before are quite different and policy implications appear to be unclear.

A diverse but related set of issues was therefore addressed in the workshops. They emerged from an analysis of the changing logic of value creation and from the emerging policy concept of platform policies. Platform policies are a result of a "design requirement" to strengthen the horizontal dimension across technologies and sectors that enable collaborative advantages to develop which are critical for innovation to occur when there are strong resource interdependencies between actors. . In short: a platform approach to innovation policy reflects a strategy to cope with complexity not only based on reductionism but also through dialog and framing in order reach shared interpretative schemes among stakeholders of contexts and objectives for policy.

1.2 The workshops

The presenters at each workshop summarize their presentations in chapters 2-5. What follows is very short introduction to the subjects covered. So there were four workshops on specific issues. In addition there was a fifth workshop where Phil Cooke as the general "rapporteur" and Arne Eriksson as moderator for the workshops presented their conclusions and policy recommendations. The synthesis by Phil Cooke will be found in chapter 6 of this report.

1.2.1 Workshop 1: Verna Allee about Value Networks

In recent years social network analysis (SNA) has increasingbly been applied to cluster analysis. This type of analysis gives information about relationships between actors in the cluster and also about external links. SNA gives information of the entire network, whether links are weak or strong and about the centrality of different actors (nodes). This type of information is very important if we apply a relational view of clusters (as opposed to a transactional view.) For a cluster to be perseveringly competitive - both innovative and operationally effective – information from social network analysis can help. According to Ronald Burt innovation is associated with bridging structural holes in a network. Those structural holes appear where only one node links two networks with one another. Granovetter coined the phrase "the strength of weak ties" to explain the potential of being the sole connector between diverse networks. This is also basically the same property that Ron Boschma ascribes his concept "related variety" when analyzing interdependencies across sectors. The innovation potential of bridging such holes has influenced Vesa Harmaakorpi in the development of the Regional Development Platform Method which will be clear from chapter 2. Verna Allee picks up on the other aspect of network analysis namely the importance of strong ties and closure (=diminish variety, enforce routines) for effective implementation. Her method – Value Network Analysis – is also highly structured in that the nodes are seen as roles rather than actors.

The applicability of Value Network Analysis for cluster and innovation policy was at the center of the first workshop. Value network analysis (VNA) is a methodology for understanding, visualizing, and optimizing internal and external value networks and complex economic ecosystems. VNA methods include visualizing sets of roles and interactions relationships from a dynamic whole systems perspective. Robust network analysis approaches are used for understanding value conversion of financial and non-financial assets, such as intellectual capital, into other forms of value.

It is a structured approach in that it focuses on identifying the different roles that organizations play in a value network. The purpose of this analysis is also to capture the various types of intangible assets that reside in any given

network, Unlike traditional SNA where every link is of the same nature, in VNA every link denotes a specific and unique value deliverable.This way of modeling nodes (as roles) and links (as deliverables) fills, according to Verna Allee ,the analytical gap (Figure 2) between the formal organization (or instutional structures), asset or resource management, social networks and business processes. It provides a more organic human-centric way of describing business activities than linear process diagrams and hierarchical organization charts. It also expands capacity for asset management to include nonfinancial assets such as intellectual capital and more clearly links social interactions to value creation.

As a method VNA fits into the picture we paint later on of an emerging logic of value creation that gives importance to "relational assets" and other types of intangibles. For more about Value Network Analysis, see chapter 3 and appendix 2 for slides.

1.2.2 Workshop 2: Johan Wallin about Business Orchestration

Business orchestration was the subject of the second workshop with Johan Wallin as presenter. Orchestration is about leadership and governance of the creation of "co-owned" assets and the co-specialisation of assets that is enabled through orchestration. Orchestration is a response to the need for both specialization and integration for which we will present some arguments later on in this chapter. To motivate actors to collaborate one has to focus on the specific offerings that may be developed based on some initial insights. The organizing would then be based on the interest generated around these potential future offerings. In the initial phase it is important to remember that any idea or insight regarding the future offering comes from an individual, but to operationalize the idea other participants also have to be engaged, i.e. the constellation has to be orchestrated. The role a government here can play is to provide support for the orchestrator.

Following this reasoning one could state that both Chandler (1962) and Collins (2001) are right that on a very crude level structure follows strategy. Once the offering is clearly defined and the actions for how to build a business around that offering begin, then the structure will be adapted to the strategy. However, at the very early phase of the innovation cycle, then individuals count. Ideas will only be generated by individuals and identifying and stimulating the right ideas is the bottleneck of the initial phase of the innovation process. On its most atomistic level strategy making is consequently about *insights* (Hamel, Prahalad, 1994), and structure is about *individuals*. If we start from this atomic level, then we can state that any innovation ultimately can be traced back to a single individual with a particular insight. Starting from this level, any innovation process therefore is an emergent phenomenon. So by increasing the level of granularity (Ramírez, Wallin, 2000) when talking about strategy and structure we ultimately end up with insights and individuals. As Simon (1991) has

emphasized, all learning takes place inside individual human heads, so insights are only generated through a fruitful interactive process among people, inside and outside the firm. How effective that process is depends on the character of the network.

Johan Wallin captures the main points of his presentation in the text in chapter 4 that are complemented by the slides in appendix 4.

1.2.3 Workshop 3: Vesa Harmaakorpi about Regional Development Platforms

The third workshop was about the regional development platform method that Vesa Harmaakorpi has developed in his work in Lahti. According to Harmaakorpi regional development strategies should be based on the sound assessment of regional resources, capabilities, competences and core competences, as well as on dynamic capabilities aiming to develop the resource configurations in order to form regional competitive advantage. His concept “regional development platform” is used as a tool for assessing the regional potentials on which sustainable, competitive advantage could be built. A regional development platform is a concept generally defined as a platform that is often industry- or expertise-based and represents the business potential of the actors working for the platform.

The Regional Development Platform Method (RDPM) is presented as a tool for designing and managing the regional innovation system. It consists of eight phases of development, in which the underlying potential in the region is explored and the exploitation of the potential organised. The experiences gained from applying the Regional Development Platform Method in the Lahti Region, Finland, are used to illustrate the ideas presented.

Harmaakorpis ideas are presented in chapter 2 and appendix 2 because of the importance from a policy perspective of the platform method as a “context marker” as well as a method. This means that the order in this documentation is slightly changed from the chronological order of the workshops.

1.2.4 Workshop 4: Markku Sotarauta on Leadership and Governance

The fourth workshop focus focused on leadership and governance with respect to clusters and regional innovation policy with professor Markku Sotarauta as the lecturer. The subject was particularly leadership and governance and what kind of (regional) capabilities are called for in order to pursue an innovation agenda in a multi- level and multi-stakeholder setting. He has expressed his view on the interplay between policy and economy in that it is essential to see regions as a giant feedback mechanisms with policymaking as a means to transform information to new interpretations

and action. Having feedback should be a continuous conversation between regional development agencies and the selected environments crucial to the region's economic base and also with citizens and local needs. This requires a new kind of open attitude together with close and sensitive links to both local and global selection environments. The base of strategies is more solid when the feedback is not only based on a few economic figures and global and national trends, but on wide conversations and a versatile range of information. Here, institutions, interpretations and dynamic capabilities are the golden triangle of the evolution of regions, and as such they deserve more attention.

1.3 Specialisation and integration

Programs and projects to support internationalization of clusters and innovation systems are increasing in numbers quite rapidly within the EU and elsewhere. References are made to globalization and changing innovation models, notably open innovation. The first argument that cluster collaboration is driven by globalisation is valid but has to be qualified in order to be useful for policy making. Following Richard Baldwin globalization can be seen as a new dimension of specialization manifesting itself in task competition and unbundling of value chains meaning that competition is no longer between industries and firms but between tasks/functions. An example is that India has made knowledge process outsourcing one of its targets and is developing relevant capabilities for this new type of clustering defined by what a firm or business unit know rather than by what product or service they offer. This change is also reflected in an increasing interest in how-strategies (Teece 2008) i.e. strategies with a focus on processes (=learning) and dynamic capabilities which is interesting since cluster strategy inspired by Porter is typically what-strategies with limited interest how the process of (re)positioning is implemented. (Co-)Specialization is driven by efficiency, exploitation or in general operational concerns. And it is clear that globalization has had a strong effect on operational cost-saving through global sourcing in value chains. Specialization is also coupled with risks for fragmentation.
But operational efficiency is a condition for survival rather than for success. There is also a requirement to offer customers products and services that they find worth paying for. This is no longer achieved by segmentation of markets. Customers have to be participants in the value creating process. Offerings include typically both hardware and software i.e. products and services. The ability to add services to the product is to a large extent the way to offer a unique customer experience at the same time as offering the product and the service as a package is a way to prohibit reverse engineering. This kind of customer or market perspective necessitates integrative capability because what is offered is often a solution to a problem.

The other side of the coin is therefore a parallel development of thinking concerning co-production between users and producers, orchestration and integration of business eco-systems (clusters and innovation systems) to define offerings and to organise the value constellations necessary to deliver on an offering. So what this boils down to is co-specialisation of assets and bundling these as capabilities (Teece (2009), Wallin (2006). This cannot be dealt with on a transactional basis and coordinated by contracts as the sole governance mechanism. Forms of relational governance are also required. In turn this leads to a need to reflect on how a cluster is perceived.
One view is to perceive the cluster basically as a network of firms in the same industry who are exploiting geographically bounded external economies resulting from similar requirements of factor inputs allowing for specialization of skills and services. The critical aspect is that each firm is considered to act independently in relation to its customers. This is what we call a transactional view of clusters. In contrast to this we can also have a relational view of clusters stressing interdependency and complementary relationships between firms. The relational view is of course part and parcel of a network perspective on a cluster. The ways networks operate is also the explanation of how the tensions between specialization and integration might be alleviated. These two views lead to very different conclusions regarding strategy and governance and hence concerning the appropriate policy mix. Some experience indicate that the view among researchers and policy makers often is that clusters should be regarded as relational entities whereas the view held by cluster firms often are that clusters are transactional.

The second argument relates to the impact of a networked world on R&D and innovation. Distributed innovation models of which open innovation is one expression, are terms coined to capture this aspect of the knowledge economy. More frequent co-authoring of academic articles is one measure. Co-creation of knowledge at the interface between users and knowledge producers is another. In relation to cluster development there is a discussion of the need for knowledge gatekeepers and also new ideas of the role and character of proximity. There is also a discussion about the relationships between concepts like expertise, skills, capabilities and different kinds of knowledge bases. The message coming forward is that knowledge flows are very important for the dynamics of clusters and innovation systems. Another is that innovation is facilitated by the capability to recombine diverse but related knowledge bases to meet an emerging need for more of cross-cluster collaboration.

Taken together these points lead to a worldview that is captured well in a recent report about Future Knowledge Ecosystems. The report is aimed to present major trends and challenges that are relevant for technology –led economic development. The concept “regional knowledge ecosystems” is used as a framework. Some important points in that framework is that focus is not on existing organisations like universities, research parks, large

companies, venture funds, etc but "on the dynamics of how they interact with each other and new non-institutional elements (talent, bodies of knowledge, virtual communities)." Second it brings a holistic approach to how we think of innovation in regions – not as an isolated activity that happens within specific firms or clusters, but as a cohesive system. Policy issues following from this concept is how to actively manage services and knowledge creation. Further, as scientific knowledge and tools become available anywhere on-demand focusing on global domination of any particular industry will lose effectiveness. Growing "the regional ecosystem elements that provide the capacity for repeatedly reinventing the cluster will become paramount", says the report. Third, all of these dictate a reduced emphasis on real estate development and infrastructure, and "more emphasis on creation mechanisms that link local assets to global markets in ways that generate value".

From a governance perspective this means that there is need for governance structures that are broad, that can manage horizontal cross-fertilisation between clusters and that can enable co-construction of concepts, co-creation of knowledge, co-specialization of capabilities and co-production of value. There is also a need for organisations that are professional and credible as orchestrators of these "layered" activities.

1.4 Emerging logic: from scale to scope

The need for both specialisation and integration is not a new phenomenon. Alfred Chandler wrote a book titled Scale and Scope on these issues in the early 1990´s. His point was that both scale and scope were needed together with organisation and management – the visible hand he talked about. Scale economies were mostly associated with production whereas economies of scope reflected market behaviour. Integration is tied to both co-ordination as an activity and organising as a vehicle for co-ordination. I argue here that the way information technology and globalisation interact and reinforce each other leads to a shift in the relative importance of scale and scope which is illustrated in figures 1.1 and 1.2. Compared to the industrial paradigm we now see an emerging logic that puts scope at the forefront in various ways in efforts to explore and exploit heterogeneity and diversity. There is an emphasis on a horizontal perspective contrary to the industrial logic that was very much vertical i.e. industries, regimes, clusters. The lateral perspective is reflected in an increased use of networks, in much tighter interaction with users in innovation, in a strengthened focus on dynamic capabilities. Orchestration becomes an important element of leadership in value creating constellations due to the distributed character of activities.

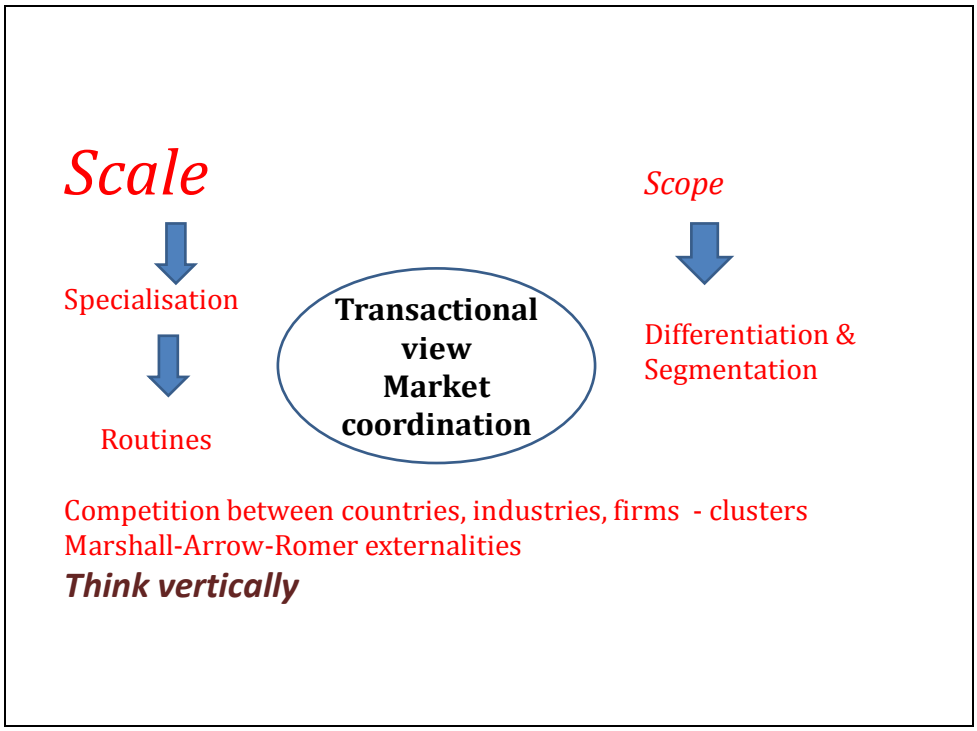

Figure 1.1 Scale and Scope in the Industrial logic

Inspiration to these conclusions comes from the literatures on business/network orchestration and systemic innovation when it comes to the adjacent or interrelated fields studying networks, leadership, strategy and governance. Johan Wallin describes orchestrated activities as being a broader concept than value-creating activities. The role of the leader is according to Wallin to provide the incentives and contexts for valuable orchestrated activities to take place. Orchestration is about information transmission and acquisition, problem solving, co-experiencing and insight accumulation. Orchestration seems to be especially important but also difficult when collaborating partners have set out to make money together. Most collaboration is based on cost sharing (=saving money together) so to make the transformation from saving to making money is a real strategic challenge. In this perspective orchestration is necessary to change from collaboration based on sharing costs (=least common denominator substantiated by history) favouring co-operation based on similarity to something very different.

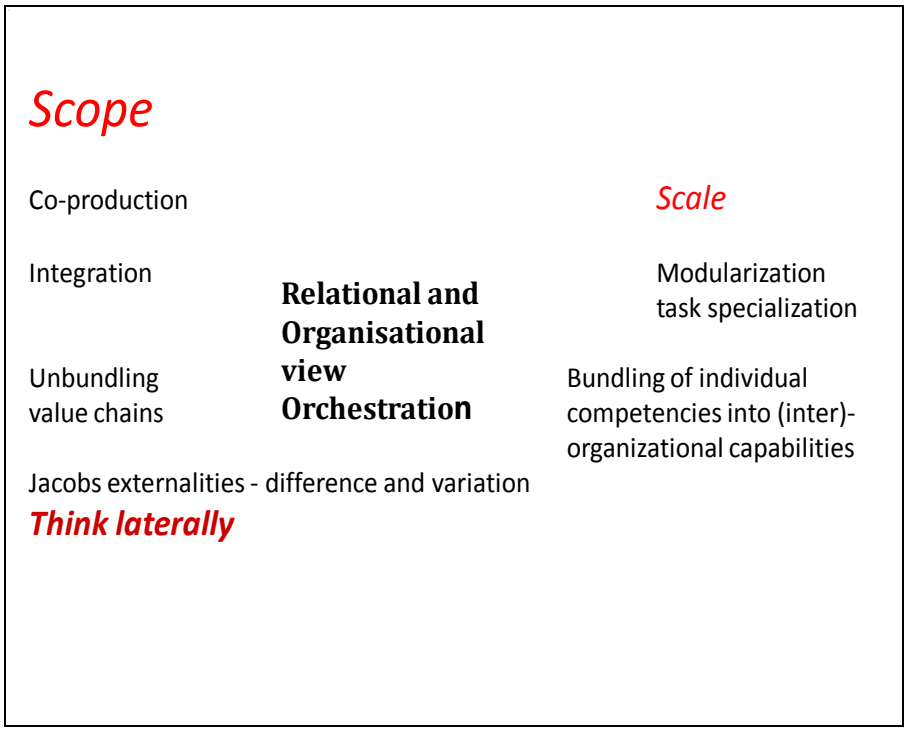

Figure 1.2. Scope and Scale in an emerging logic

To create collaborative value there has to be interaction and integration among partners that have complementary capabilities. Realising future prospects rather than shared cost structure shape the character of common efforts. The shift from the vertical and often transactional paradigm to the emerging where relational assets, co-specialisation and co-production are defining elements are more or less in line with prevailing dominant logics for value creation. In order to have impact the emerging paradigm must change prevailing regimes according to the research on strategic niche management. Technology is a key driver and regimes are normally challenged by disruptive change. What is now also interesting is that the societal challenges we face globally can be turned into market shapers if they are acted upon also from an innovation perspective. So what is playing out is a "game" between the approaches to accommodate the need for change within the existing dominant logic and novel approaches to design and implement system innovation, se figure 1.3.

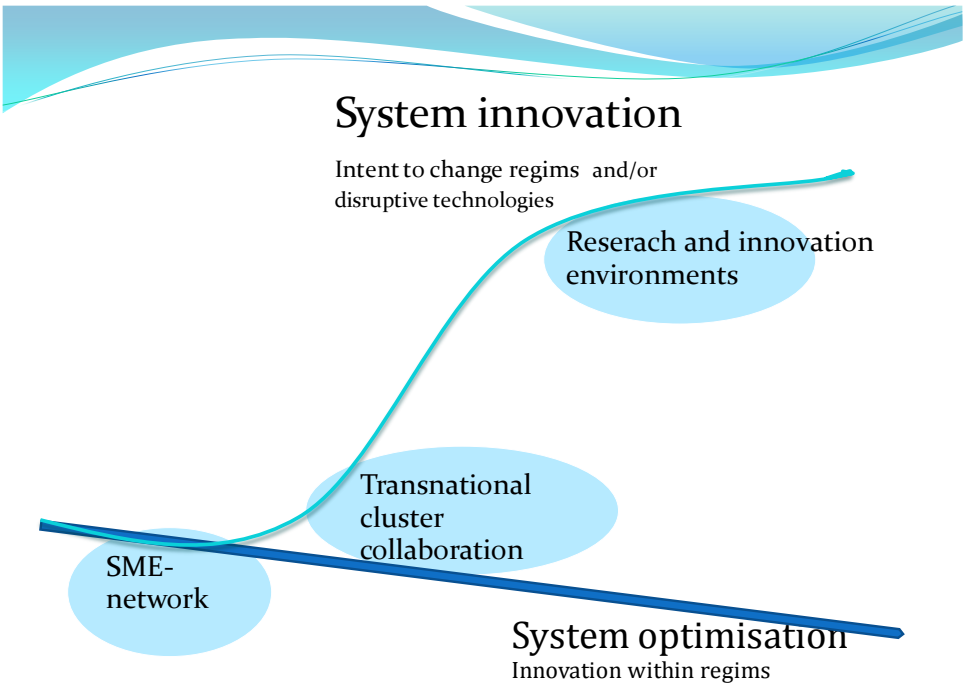

Figure1.3. Strategic options for innovation policy

Strategic Niche Management is about co-development of technologies and markets. The issue is how to allow for new (emergent) innovation systems to develop taking into account that radical innovation is constrained by prevailing concepts, dominant logics and regimes. Transition is used to capture the notion that at some moments in history the expectations on emerging technologies to radically change the society are more pronounced than normal. Concepts like breakthrough technologies, long waves and system innovation are used. The change process described by SNM rests on the assumption that new technologies cannot survive in mainstream markets and need protection. Niches act as 'incubation rooms', providing space for the nurturing and development of novelties. To challenge regimes includes a critical assessment of factors in the "policy landscape" as well as factors the influence specific policy regimes. The policy landscape can be thought of as deep rooted and slowly changing factors the affect policy making in all areas. Change of regimes occurs through changing experimentation and market creation. This is a process involving entrepreneurial activity and government financing and reregulation as well investment in new capabilities and calls for animation and orchestration.

Another important feature is that the change process is analysed in terms the interaction between three different levels. The multi-level perspective distinguishes three analytical levels: the niche-level that accounts for the emergence of new innovations, the sociotechnical regime level that accounts for the stability of existing systems, and the sociotechnical landscape that accounts for exogenous macro-developments. The sociotechnical regime is

an extended version of Nelson and Winter's (1982) technological regime, which refers to cognitive routines shared in a community of engineers. These shared routines guide their R&D activities in similar directions, leading to development along technological trajectories.

Whether or not VINNOVA can act on these ideas is to a very large extent dependent on the overall Swedish policy context in which VINNOVA is one of several actors and they are all situated in a specific policy landscape and policy regime. Our previous discussion of transition governance or transition management which is term used by the government in the Netherlands can be elaborated a little bit further as is shown in figure 1.3. There is a "baseline" which indicates that the existence of a dominant logic will lead to path dependencies that basically reproduce the regimes. The innovation path will be one of system optimization rather than system innovation. For system innovation to occur there is a need for shocks which most often arrive in the form of disruptive technologies. There is however also an option for policy initiatives to be successful, as shown by the examples from Bayern Innovative and from Lahti, see chapter 6 and chapter 2. The critical issue for policy initiatives is whether or not they reflect deliberate efforts to challenge prevailing regimes.

To challenge regimes includes a critical assessment of factors in the "policy landscape" as well as factors the influence specific policy regimes. The policy landscape can be thought of as deep rooted and slowly changing factors that affect policy making in all areas. We think that there are two aspects of the Swedish policy landscape that will have to be questioned in relation to what has been said before about transition and platform governance. The first is that the economic transformation that we have described can be interpreted as economies of scope becoming more important for value creation and economies of scale becoming relatively less important. This is illustrated in figure 1.2.

The point is that we have a strong inclination to focus on scale effects in the Swedish economy which is easily understandable given our historical reliance on paper & pulp, iron & steel and other scale-intensive industries. In order to create positive scale economies there is need for specialisation within sectors which is facilitated by standardisation. The emerging knowledge dynamics paradigm favours "scope thinking" which is reflected in ideas of co-production where users become part of the value network. The customer focus also leads to an increased focus on integration that together with the distributed (networked) governance of the production resources give rise to a need for orchestration to use Johan Wallins term. The emerging paradigm favours capabilities that are different from those that created success when the industrial paradigm applied. Most important is that it calls for a new stance towards complexity. The reductionist approach

no longer applies in the same way. Mindsets and methods to absorb complexity through continous innovation and experimenting will have to be developed. This is part of what is captured by terms like collaborative governance where the platform approach belongs.

The very strong focus on production efficiency in industry as well as in the public sector will have to be replaced for transition and system innovation to occur. An example of this is the policy view on research and innovation. Public funding of research is seen as a support to a production activity because that is what corresponds to the governance mechanisms in the state budget with its focus on management by results and control. Innovation is an outcome of interaction between actors in a network which means that innovation is by definition an emergent phenomenon. Hence it cannot be accounted for or controlled. Here is a marked difference with Finland where innovation recently has been set by Government to be a top priority for all policy fields. And this difference in the view of innovation in the policy landscape between Finland and Sweden also most probably explains why the proposals to imitate the Innovation Council that Finland launched more than a decade ago has led nowhere. There is no place for such a body in the Swedish policy landscape for the reason that is assumes a production oriented and sectorally governed innovation system. The conclusion of this is that the tendency in the Swedish innovation system to promote system optimization is very strong. Deliberately challenging policy regimes seldom happen. But at the same the message in this report is an increased emphasis on horizontal or boundary crossing approach to innovation and innovation policy is required in order to meet the challenges posed by climate change, demography and globalisation.

The transitional challenge is illustrated in figure 1.4. The different overlapping triangles represent clusters in an innovation system. The top of each triangle represents the market focus where success factor is to be unique. Further down there are overlaps in terms of knowledge and capabilities. These overlaps form the basis for reconfiguration and co-specialisation over time in order to find solutions to new problems/potential markets shown as the fields between clusters. Most overlap is at the base of each triangle representing the cultural and cognitive factors that influence value creation.

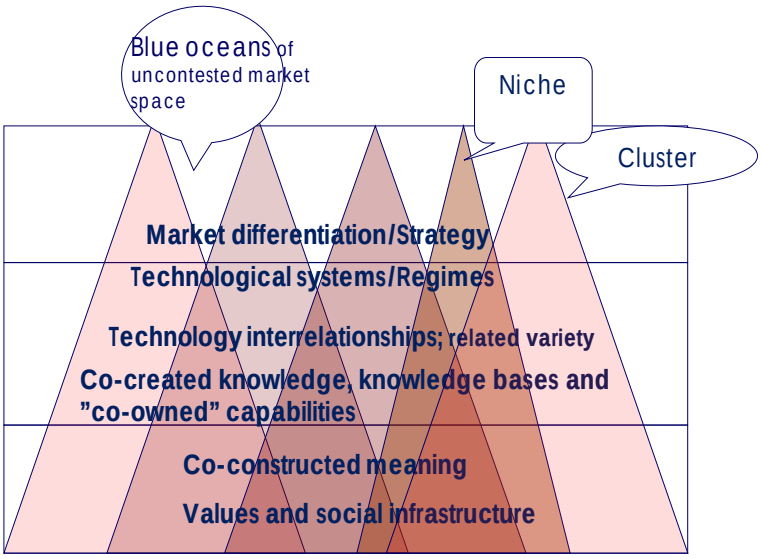

Figure 1.4. Specialisation and interdependencies in an innovation system

The strategic issue for the design of Grand Challenge initiatives is to organise a process that explores the value creating opportunities related to Grand Challenges or the uncontested market spaces between clusters. Exploring the market potential of Grand Challenges requires foresight and also a design of a foresight process that enables cross-cultural exchange. The assessment of potential is to a large extent conditioned by present capabilities. New capabilities are developed through reconfiguration of existing expertise and through investment in research and other forms of expertise. Relatedness is a keyword. As far as Grand Challenges or system innovation is concerned this process is a mix of top-down and bottom-up. It is also a process that involves business, knowledge providers as well as public agencies.

In my view it is important to realise the strategic role of a services transformation in this context. Services today account for around 40% of total profit for Ericsson. The Finnish company Metso defined itself as a services company several years ago which may come as a surprise since it is producing wood products. More generally, leading firms are reformulating their business models by embedding products within service offerings, and giving them new functionality to avoid commoditization. Globalisation seen as task competition has also a clear service dimension in that firms are increasingly agglomerations of services purchased on markets Production capacity and R&D capabilities, accounting, other business functions and

even corporate strategy are part of the portfolio available. This development of knowledge intensive business services (KIBS) has also laid the foundation for a new type of task or capability based clusters like the ones in India with Knowledge Process Outsourcing as common denominator. A third aspect is that the recognition of KIBS may also have an effect on overall economic growth. This is because KIBS are believed to serve as "bridges" for knowledge flow between firm and other organisations, as well as across industries. Hence they may function as carriers, facilitators and sources of innovation in the economy and thus play a very vital role in an emerging paradigm where cross-fertilisation and bridging structural holes becomes decisive. They are part of the knowledge infrastructure since this type of firms often acts as intermediaries between university research and private companies as regards provision and use of knowledge services. Finally services are of course important as sources of job creation.

In summary it is my belief that the services transformation will fundamentally change business strategies, market competition, work and its organisation. Firms are already being reorganised, markets reconfigured, business models transformed and entirely new service offerings generated. From a policy perspective the emerging paradigm poses a number of challenges. Policies must increasingly be designed to deal with complexity and heterogeneity and allow for "customised solutions" in the implementation phase. Notions of policy making as a linear and sequential process must be complemented by policy approaches based complex problem solving and network organising. Concepts like platform policies, policy mix, multi-level and multi-sector governance are all responses to the emerging requirements on policy making. In another words the innovation policy challenge is to make systems thinking and systemic view more than rhetoric

1.5 The matrix approach to innovation policy.

The title of this report refers to an emerging policy approach that we can see developing. The Regional Platform Method developed by Vesa Harmaakorpi is an early example. Another early example of matrix or platform thinking is presented in a study by a group of researchers headed by Phil Cooke in a report titled Constructing Regional Advantage. This is expressed as follows in a final recommendation in the report: *"While rigid sectoral policies at the regional levels can be at risk in a globalised competition, a platform approach offers a context better equipped to exploit multipurpose and generic technologies. Therefore, policy platforms, which help articulate an array of instruments from several policy domains, will facilitate the formation of necessary capabilities in regions without existing capabilities to construct regional advantage".*

In general this use of the two-dimensional matrix is probably also a result of the realisation that systemic policies inherently see the policy content dependent on some type of "context marker" like industries, clusters or regimes. In evolutionary terms context is often the same as selection environment. Policy content is defined by the policy rationale(s) of two sorts namely market failures and systemic failures. The latter can be exemplified by capability, communication or co-ordination failures. In a study in the Skane region in Sweden content – the rows in the matrix – was given by using functions of innovation systems as defined by Swedish and Dutch innovation researchers.

Two dimensions are, however, not sufficient if governance is to be taken into account which is necessary not least due to the multi-level and multi-stakeholder character of "innovation governance".

One conclusion this leads to is that regional innovation strategies is beginning to meet the requirements of a systemic and regionally based innovation policy but that that there is still more to be done. Most work in that direction must be oriented towards capabilities- and learning based strategies which is also an argument by Markku Sotarauta in his article, see chapter 5. The literature on dynamic capabilities stress strongly that capabilities are mix of several types of assets and that they increasingly reside in networks as "co-owned" assets. Two ideas follow from this. The first idea is that this makes relatedness a very central concept. From an analytical perspective this goes back to Jane Jacobs and more recently to the work of Ron Boschma on related variety. But social network analysis is also about relatedness – ties that are weak or strong. In a policy perspective we can interpret the ideas of platform policies or joined-up governments, horizontal policies etc against the backdrop of relatedness. Relatedness can in this context be seen as reflected in what is called wicked problems. Sorting out wickedness is to deal with complexity. Relatedness creates interdependencies which in turn make it a required capability to have the ability to manage boundaries and interfaces. Relatedness becomes therefore also a concept strongly related to collaboration, co-ordination and governance

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2 The ‘Regional Development Platform Method’ as a Tool for Innovation Policy by Vesa Harmaakorpi

2.1 Introduction

The mainstream economic development policy in Europe has relied on a cluster approach and on the power of knowledge and research as the sources of innovation. Innovation policy has been to a great extent equivalent to science and technology policy and cluster policies have aimed at building competitive advantage with strong regional and national clusters. Recent discussions have, however, emphasised other forms of economic order and origins of innovation. According to innovation surveys, only 4 per cent of innovations are based on scientific sources. Cluster policy seems to have its weaknesses, as well. Some researchers have called the problematic situation “the European paradox” – where the current science and technology policy is not very efficient, partly due to the fact that innovation policy and science and technology policy are not clearly defined but are mixed up in speech. Regions having enough related variety in the economic structure seem to be successful in building constructed competitive advantage – leading to platforms rather than clusters as the focus of analysis. Moreover, the practical context and interaction between the two subsystems of an innovation system (acquisition and assimilation of knowledge; transformation and exploitation of knowledge) seem to offer a lot of unused potential for innovation. This potential remains largely untouched due to lack of policy measures to foster practice-based, networked innovation processes that combine diverse knowledge bases.

2.2 Proximity and Distance Challenging Regional Innovation

Since the 1990s, there has been an increasing interest towards the notion of proximity in the context of economic development in general – and innovation in particular. It is widely agreed that proximity contributes to the economic performance. As such, the notion of proximity is a generous one, a sort of an “umbrella” concept consisting of different dimensions. The general idea behind this umbrella is that proximity, in whatever form, somehow reduces the uncertainty of economic activity, contributes to solving the problem of coordination between different actors, and facilitates interactive learning and innovation.

When analysing the logic and dynamics of innovation, at least four functions of proximity have been identified. First, being close to each other helps companies to develop an efficient division of labour and coordinate their actions, facilitating the development of a core of specialised suppliers and partners. Second, there are externalities of proximity available to all within a region. In particular, these externalities are related to the localised human resources (workforce) and know-how. Third, there is evidence that when companies of the same industry are located close to each other, it forces them to innovate by creating an environment where companies compete, in a positive sense, with each other . Fourth, and perhaps most importantly, proximity is relevant for the appearance of knowledge spillovers and learning processes between the actors.

Achieving innovations was earlier seen mostly as linear processes leading from scientific work to practical innovative applications. Nowadays, innovation is most often considered to be a result of co-operation in normal social and economic activities. An innovation process normally includes many kinds of interaction. Consequently, innovations are not just results of scientific work in a laboratory-like environment. They are done in networks, where actors of different backgrounds are involved in the process that demands innovativeness. Innovations emerge more and more often in practical contexts leading to, for example, middle-ground innovations, in which knowledge from different disciplines as well as practical and scientific knowledge interests are combined. Innovativeness depends in most cases on the innovation network's ability to interact rather than on an individual actor's progress in a particular scientific field.

Business innovations are essentially tied to practical business. The framework of research is only one factor in determining the context of innovation. Innovation processes are created by many triggers and take place in networked multi-actor innovation networks. These processes occurring within a practical context are called *practice-based innovation processes* in this paper. We define them as innovation processes *triggered by problem-setting in a practical context and conducted in non-linear processes utilising scientific and practical knowledge production in cross-disciplinary innovation networks.* In such processes there is a strong need to combine knowledge interests from theory and practice, as well as knowledge from different disciplines.

The social nature of innovation implies that knowledge production takes place within groups of people having a common interest determined by the practical context in which the group is working. However, these people often have very different backgrounds (work history, education etc.). In practice-based innovation processes there is a common practical context within which a problem to be solved has to be specified. Within this practical context each co-operator may have a different point of view, hence

the specific problems they have in mind may differ. However, they solve their problems within the same context. They localise the context in a different way by asking different questions. However, they must have a common dialogue; each has to be a dialogist in a common dialogue, that is, in a process of building something new within a context.

Innovation in practical multi-actor contexts is nourished as much by distance as by proximity. Distance refers to different kinds of dimensions that have different types of impacts on innovation processes. The dimensions are summarised in Table 1.

Table 2.1. Distances in innovation networks

Distance	***Source***	***Innovation potential***
1. Geographic	Physical distance between actors	Geographic proximity does not automatically lead to innovations, but it may, for instance, facilitate social proximity.
2. Cognitive	Differences in ways of thinking and knowledge bases	A certain degree of cognitive distance enables creation of new innovations.
3. Communicative	Differences in concepts and professional languages	When making a new idea understandable concepts from other fields or sciences, for instance, may be utilized.
4. Organisational	Differences in ways of coordinating the knowledge possessed by organizations and individuals	An organization should have both strong and weak links in its network.
5. Functional	Differences in expertise in different industries/clusters	It is useful to obtain novel information also from outside of one's own field of operations. In such cases, the information often needs to be adapted to the field of operations in question.
6. Cultural	Differences in (organizational) cultures, values etc.	The challenge is to get people working in different organizational cultures to collaborate.
7. Social	Social relationships and the amount of trust included in them	Innovations require interaction among different kind of actors. Trust helps in creation of radical ideas.

The interplay between proximity and distance has been discussed within several theoretical frameworks. The discussion in some of them is summarised in Table 2.

Table 2.2. Proximity and distance in innovation according to some theories and frameworks

Theory/Framework	***Description***	***Innovation Considerations***	***Theorists***
Network morphology – Strong ties, Weak ties, Structural holes	Innovation environment consists of a network morphology of strong ties and weak ties in social networks. The strength of a tie	The weak ties, including the element of distance, are reported to be more fruitful for innovations, because more novel information flows to the	Granovetter, 1973, 2005 Burt, 1992, 2004

Theory/Framework	*Description*	*Innovation Considerations*	*Theorists*
	is a combination of the amount of time, emotional intensity, intimacy and reciprocal services that characterise the tie. Structural holes are found between the dense network structures.	individuals through weak ties than through strong ties. However, a regional innovation system in which networks with strong ties are lacking could be incapable of utilising the potential existing in the structural holes.	
Social capital – Bonding social capital, Bridging social capital	Social capital refers to features of social organisation – such as trust, norms and networks – that can improve the efficiency of the society by facilitating co-ordinated actions. Bridging social capital creates bonds of connectedness formed across diverse horizontal groups, whereas bonding capital only connects members of homogeneous groups.	The division of social capital into bridging and bonding types becomes crucial in assessing innovativeness, since it is essential both to build an atmosphere of trust and proximity (bonding social capital) in each innovation network and to keep them open and diverse (bridging social capital) to allow the necessary diverse flows of information to take place.	Coleman, 1988 Putnam, 1995 Tura & Harmaakorpi, 2005
Knowledge production – Mode 1, Mode 2	Mode 1, traditional knowledge production based on single disciplines, is homogeneous and primarily cognitive knowledge generation the context of which is within large academic paradigms. Mode 2 knowledge production, by contrast, is created in broader, heterogeneous interdisciplinary social and economic contexts within an applied setting.	Mode1 knowledge production sets the basis for scientific innovations in science-push innovation processes characterised by cognitive proximity. Mode 2 knowledge production is important in practice-based middle-ground innovations that often take place in networked non-linear innovation processes.	Gibbons *et al.,* 1994 Howells, 2000
Absorptive capacity – Realised absorptive capacity, Potential absorptive capacity	Absorptive capacity is an organisation's ability to value, assimilate and apply new knowledge. Potential absorptive capacity is important in acquiring and assimilating external knowledge; realised absorptive capacity in transformation and exploitation of the knowledge gathered.	Potential absorptive capacity is crucial when a company tries to secure the richness of information flows in order to create middle-ground innovations. Without realised absorptive capacity it is impossible to operationalise the new knowledge into innovations.	Cohen & Levinthal, 1991 Zahra & George, 2002
Agglomeration economies – Localisation economies, Urbanisation economies	Location economies assess agglomeration as a process external to the company but internal to the industry, urbanisation economies as a process external to the industry and internal to the region. Urbanisation economies are concerned with the size and density of an urban area, whereas location economies are concerned with the size of an industry in producing economies of scale.	Location economies rely strongly on physical, cognitive, functional, cultural and social proximity in innovation. Urbanisation economies are based on physical and functional proximity, but also benefit from cognitive, cultural and social distance that are important for middle-ground innovations.	Marshall, 1916 Christaller, 1933 Lösch, 1954 Chinitz, 1961
Innovation systems – Sectoral innovation systems, National innovation systems, Regional innovation systems	An innovation system is a system of private and public companies, universities, and government agencies, with regular and strong internal interaction promoting the innovativeness of the entire system and characterised by embeddedness. A sectoral system is based on a specific knowledge base, technologies, inputs and demand. National and regional systems are based on national and regional entities.	A sectoral system is based on a specific knowledge base, technologies, inputs and demand. National and regional systems are based on national and regional entities. Therefore, sectoral innovation systems include a relatively high amount of cognitive and organisational proximity, whereas regional and national innovation systems are prone to possess social and cultural proximity and – especially regional innovation systems – functional proximity.	Freeman, 1987 Lindvall, 1992 Cooke *et al*., 1997 Malerba, 2002

2.3 Towards the Regional Development Platform Model

On our way towards the world of regional development platforms we need to take a closer look the two concepts describing agglomeration economies: location economies and urbanisation economies. Location economies assess agglomeration as a process external to the firm but internal to the industry, urbanisation economies as a process external to the industry and internal to

the region. According to the theories of location economies, the existence of industry based production agglomeration originates from the existence of economics of scale in large-scale production within the same production unit or among different production units. Urbanisation economics focuses on studying agglomeration on an urban area level. According to these theories, the inter-industry relations are an important source of productivity. Urbanisation economics is concerned with the size and density of an urban area, whereas location economics is concerned with the size of an industry in producing economies of scale.

The theories of location economies and urbanisation economies touch upon many concepts and theories assessed in Table 2: (i) the strong links of the networks are closely related to location economies, and the weak links to urbanisation economies; (ii) bonding social capital plays a central role in location economies, whereas bridging social capital is seen as essential in the framework of urbanisation economies; (iii) mode 1 knowledge production promotes location economies, and mode 2 knowledge production nourishes urbanisation economies; and (iv) realized absorptive capacity is in a main role in location economies, and potential absorptive capacity is needed in urbanisation economies. The operation models of location economies are thus based on proximity, and urbanisation economies use the potential existing in the different dimensions of distance.

Porter created his influential diamond model emphasising the meaning of "home base" for the competitiveness of firms. According to Porter, firms are the real competitors in the world economy, but their success is strongly related to the features of their home base. Clusters are knowledge agglomerations where a positive circle is achieved by strong investments in specialised production factors. Especially Porter's work has lead to clusters being the hegemonic way of outlining regional innovation policy. The theories of innovation systems have however been challenged recently. A regional innovation system can be defined as a system of innovative networks and institutions located within a certain geographical area, with regular and strong internal interaction that promotes the innovativeness of the region's companies. Thus, it can be defined as an institutional environment where innovation capability is facilitated between different kinds of actors.

Some results challenging the concept of clusters can be found in the studies concerning related variety. These studies show that agglomerations in sharp regional clusters do not increase regional competitiveness. Neither can competitiveness be promoted effectively by decentralising the scarce development resources in very many different industries without co-operation between these industries. Instead, the regions allowing different industries to grow and focusing on synergies between those industries seem to succeed better. The phenomenon of related variety and its exploitation as a driver of innovative capability seem to create a new direction for the innovation policy – leading us to the framework of development platforms.

The regional development platform approach has somewhat different characteristics than the approaches mentioned previously. Its fuel lies in the logics of urbanisation economies emphasising the power of related variety. It has its intellectual roots in the frameworks of regional innovation systems and evolutionary economics. The concept of a regional development platform is strongly bound to the institutional (formal and informal) set-up of a region and can, therefore, be a useful tool in exploring existing business potentials in manifold regional resource configurations. The concept of regional development platforms is related to the concept of clusters. However, regional development platforms aim to describe the potential to form future regional clusters from the existing resource basis rather than existing clusters. These development platforms emerge from often very unorthodox combinations that exploit regional related variety. Regional development platforms can be defined as *regional resource configurations based on the past development trajectories, but presenting the future potential to produce competitive advantage existing in the defined resource configurations. The central power of the development platforms can be found in exploiting distance as innovation potential, but synergy in the platforms is emphasised in terms of related variety.*

Possible competitive advantage is based on the dynamic capabilities of the actors working for the platform. The actors of a regional development platform are the firms, technology centres, expertise centres, research centres, educational organisations, etc. contributing to the defined development platform. A regional development platform must be separately defined each time. A development platform is often based on an industry, area of expertise or future megatrend or a combination of those. A development platform is connected with the past trajectories, but the concept describes the future potential of the platform. Technological development may create totally new platforms. However, they are usually based on the accumulated work done within the existing platforms.

In Table 2.3, the regional cluster model and regional innovation platforms are assessed with the help of the framework created in Table 2.

Table 2.3. Cluster policy and network-facilitating innovation policy in the Lahti Region.

Theory/Framework	***The Cluster Model - agglomeration***	***The Regional Innovation Platform Model – related variety***
Network morphology – Strong ties, Weak ties, Structural holes	The cluster model promotes in particular the strong ties of the regional innovation system. It strengthens the ties by organising activities inside the cluster and trying to form a joint vision for each cluster.	The "fuel" of the regional innovation platforms are the weak ties of the regional networks, and especially inter-regionally. The structural holes are actively utilised.
Social capital – Bonding social capital, Bridging social capital	The cluster model emphasises the aspects of bonding social capital by, for example, promoting a common vision for a cluster. It tries to build a feeling of togetherness and social cohesion inside the cluster.	The objective of the regional innovation platform model is to bridge different groups regionally and inter-regionally. The inter-industry innovation benchmarking club is the tool for increasing regional bridging social capital.
Knowledge production –	The cluster model tends more likely to foster Mode 1 knowledge	Mode 2 knowledge production in practical contexts is the

Theory/Framework	*The Cluster Model - agglomeration*	*The Regional Innovation Platform Model – related variety*
Mode 1, Mode 2	production since the companies and university members in cluster meetings are from the same branch.	main business of the regional innovation platform model. The innovation potential is explored between different fields of knowledge.
Absorptive capacity – Realised absorptive capacity, Potential absorptive capacity	The cluster model is adequate to increase the realised absorptive capacity in the regional innovation networks due to its promotion of bonding social capital.	The regional innovation platform tries to increase potential absorptive capacity, in particular, by new methods of futures research and foresight. Particular attention is paid to the new methodology to assimilate foresight information and convert it into future-oriented innovation knowledge.
Agglomeration economies – Localisation economies, Urbanisation economies	The cluster model takes advantage mainly of location economies combining companies in the same industry.	The regional innovation platform model takes advantage of urbanisation economies by the spillover processes between industries inside the region.
Innovation systems – Sectoral innovation systems, National innovation systems, Regional innovation systems	The cluster model primarily enhances the sectoral knowledge base. It also binds the regional cluster in the international sectoral innovation system.	The regional innovation platform model is based on the theories of regional and national innovation systems. It is important for the Lahti Region to make use of the national resources because of the scarce regional knowledge-base.

2.4 The Regional Development Platform Method

The Regional Development Platform Method (RDPM) is presented as an institutional and social innovation and a tool for a regional innovation policy. The tool is based on the resource-based view of regional development, but has been planned to make a region sensitive to adapting to the changes in the techno-economic paradigm. Another central basis of the tool is the recognition of the networked regional development environment. Particular attention is paid to the interactive manner of designing and running the regional innovation system. All the phases of the method are planned so they can be conducted in a networked interaction where participation is possible – without forgetting the importance of the leadership role in the process.

The Regional Development Platform Method helps to look for regional business potentials on which it is possible to build the future competitive advantage of a region. The dominating idea in developing the Regional Development Platform Method has been the importance of the individual regional development paths in designing development strategies. The strategies should be based on a thorough assessment of regional resources, capabilities and competencies, and future possibilities leading to business potentials able to give a region competitive advantage. An essential part of the method is the core process thinking, which is designed to form innovation networks aiming at exploiting the business potentials existing in the regional development platforms. Moreover, the Regional Development Platform Method can be seen as a network leadership tool helping the regional actors to interact during the development process and helping to promote social capital and dynamic capabilities in a region.

In Figure 2.1, the principle of industries and areas of expertise forming resource configurations in the Regional Development Platform Method is presented. Areas of expertise are formed by skills, capabilities and competencies considered to be important independent of industry. Industries are marked in the column and the areas of expertise chosen for each individual study are marked in the rows. The Regional Development Platform Method aims to define business potentials able to give regional competitive advantage based on the industries, areas of expertise and especially on their combinations.

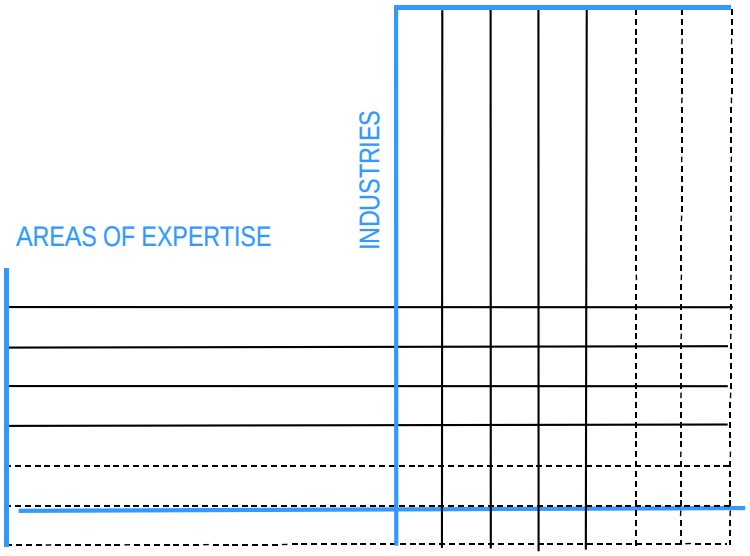


Figure 2.1. Principle of Industries and Areas of Expertise in the Regional Development Platform Method. Industries are marked in the column and the areas of expertise chosen for each individual study are marked in the rows.

Some central criteria occur when assessing different industries as part of the regional development platform method. Such criteria help to evaluate the industries' potential for the region. These criteria are, for example: the growth potential of the industry, the quantity, quality and structure of the industry, internationalisation of the industry, the innovativeness of the industry, the ability of the management in the industry, the quantity of the research conducted in the region, the quantity and quality of the education given in the region and the ability of the technology transfer organisations in the region. The following criteria can be used when assessing the areas of expertise in the region: the quantity and quality of the knowledge intensive business services (KIBS), the innovative capability of the expertise, the interregional networks of the expertise, the quantity and quality of the education given in the region and the ability of the technology transfer organisations in the region. As social capital can be seen as an increasingly important regional resource, the assessment of it in different regional development platforms should also be included in an advanced analysis.

The Regional Development Platform Method consists of eight phases:

- analysis of the changing techno-socio-economic paradigm and benchmarking through the assessment of regional innovation system theories and conventions,
- background study of the industries and areas of expertise in the region,
- expert panels,
- assessment of future scenarios,
- definition of potential regional development platforms,
- conceptualisation of the regional innovation system,
- search of core processes of the regional innovation system and
- definition of the knowledge creation and management system.

The Regional Development Platform Method is based on resource-based view of development and includes the concept of dynamic capabilities. The method aims at renewal of regional resource base by promoting dynamic capabilities and building new regional development platforms the regional level, dynamic capabilities are defined as the region's ability to generate in interaction competitive development paths in a turbulent environment. Dynamic capabilities aim to reform regional resource configurations based on the history of the region and opportunities emerging from the techno-socio-economic development. Five dynamic capabilities are considered to be essential in a networked regional innovation environment: (i) innovative capability, (ii) learning capability, (iii) networking capability, (iv) leadership capability and (v) visionary capability (see Figure 2.2).

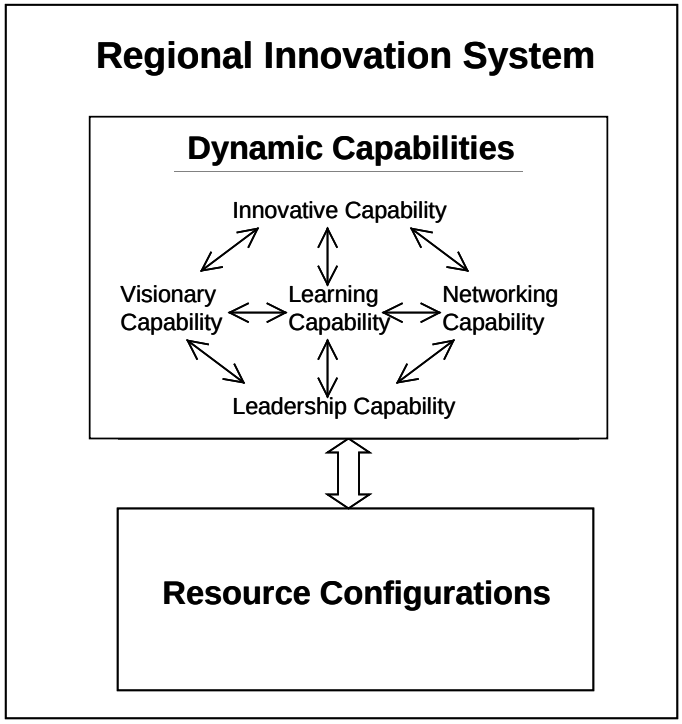


Figure 2.2: Dynamic capabilities in promoting regional innovation system.

3 How is value really created? The Value Networks Approach by Verna Allee

Purposeful networks consist of specific roles and value interactions oriented toward the achievement of a particular task or outcome. Verna Allee defines these as *value networks* – sets of roles and interactions creating specific business, economic or social outcomes through complex dynamic exchanges of tangible and intangible value. *Tangible exchanges* are formally structured or contractual interactions directly generating revenue or funding. *Intangible exchange*s consist of all the informal, often ad hoc – yet critical supporting exchanges of information, support, and benefits.

Value Network Analysis (VNA) determines the potential for value creation in internal and external networks by considering tangible (contractual) relationships and intangible (informational or knowledge sharing) relationships – together. This is based on the assumption that creating value and achieving desired outcomes requires both contractual business relationships and informal innovation pathways represented by knowledge sharing and other types of mutual support.

The value network approach therefore can be applied to virtually any business activity. VNA has been applied to a wide range of business issues in global companies, start ups, government agencies and non-profit or civil society organisations. Part of its growing adoption is due to the fact that the basic modelling language and method can be learned in just a few hours. Thus it lends itself readily to being a management tool. At the Boeing Company (Boeing), for example, it is included as a method in their Lean+ Toolkit and is being used now with 1/6 of their workforce. Symantec uses VNA to model and monitor the customer support experience. The ITIL handbook, a basic guide for the IT community, has included VNA as a strategy tool. In British Columbia a network of healthcare providers are using VNA to assess and benchmark healthcare networks across the region. It has been used in industry analysis for global finance, hospitality, travel and others.

3.1 How is value really created?

For many businesses intangibles represent 70-100% of their value, as reported in Intangible Asset Magazine in January 2009. Increasingly – knowledge and other intangible assets such as human competence, the

ability to form strong relationships, and a capacity for mutually beneficial collaboration are the foundations for success.[1] Companies recognize that the next stage of business optimization will come from visualizing and defining their internal and external *value network* ecosystems.

The challenge in getting to that point though is that in the world of business processes and human interactions have been treated as two complementary but separate business management arenas. Tools and methods for managing transactional business activities (resource planning, process management) rarely address human issues. On the other hand, tools, exercises, and practices to improve collaboration and working relationships are rarely linked strongly to specific improvements in business processes. Certainly the organization chart fails to capture the real cross boundary nature of the work itself. Even the recent interest in social network analysis (SNA) fails to bridge this gap; it makes social networks and knowledge flows and "innovation pathways visible but people struggle to make business linkages. But the technical nature and social sensitivities associated with the method work against it as a common management tool.

This two worlds problem presents huge challenges, especially in complex environments. People miss emerging opportunities at the strategic level, suffer poor business performance because critical human interactions are not supported and fail to integrate appropriate support mechanisms and technologies supporting the true organic nature of work.

3.2 A theory of value conversion

What is needed is a fresh perspective on how value is really created. Both Value Network Analysis and Social Network Analysis draw from exchange theory and address the question of how social relationships convert into other forms of value. Allee's approach to VNA departs from mainstream exchange theory, however, by linking the network to both financial and non-financial performance and asset generation both for the network overall and at the level of individual roles and transactions.

Participants in a value network, either individually or collectively, *utilize* their tangible and intangible asset base by assuming or creating roles that *convert* those assets into more negotiable forms of value that can be delivered to other roles through the execution of a transaction. In turn, the

[1] Although the concept of intangibles has auditing origins, only recently has there been a serious effort to create standardized Taxonomies for non-financial reporting, such as the Enhanced Business Reporting Language (XBRL). Asset management at the corporate and national levels is being expanded to include Knowledge Asset indicators and Intellectual Capital

true value of deliverables received is *realized* by participants when they convert them into gains or improvements in tangible or intangible assets. The Value Conversion Model in Figure 1 illustrates this value conversion (Allee, 2008).

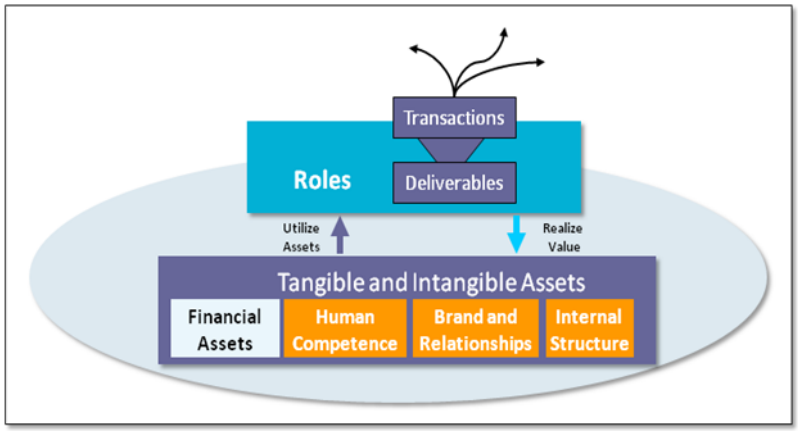


Figure 3.1: Value Conversion Model

The emergent purpose and value dynamics of the network are revealed through the particular pattern of roles (played by individuals or organizations) and value exchanges in service to fulfilling an economic or social goal or output. Shared purpose and values may be *either* tacit or explicit but can be deduced from the network patterns and the nature of the exchanges. Value is continually being negotiated between roles to meet the needs of both individual participants and overall purpose and values.
This value network model assumes sustainability of the network is dependent upon there being a high level of perceived value from the view of the participants. They must feel their participation brings them direct benefit. Sustainability of the network increases as the participants realize increasing value from their interactions and if the network itself is perceived as being of high value in terms of its social or economic outcomes.
Therefore understanding the actual deliverables of a value exchange and the unique behaviour of individual roles is essential to understand if, when, and how both tangible and intangible value is being created. Figure 3.2 builds on Figure 3.1 by depicting how the value conversion strategy of a participant relates to the pattern of the value network.

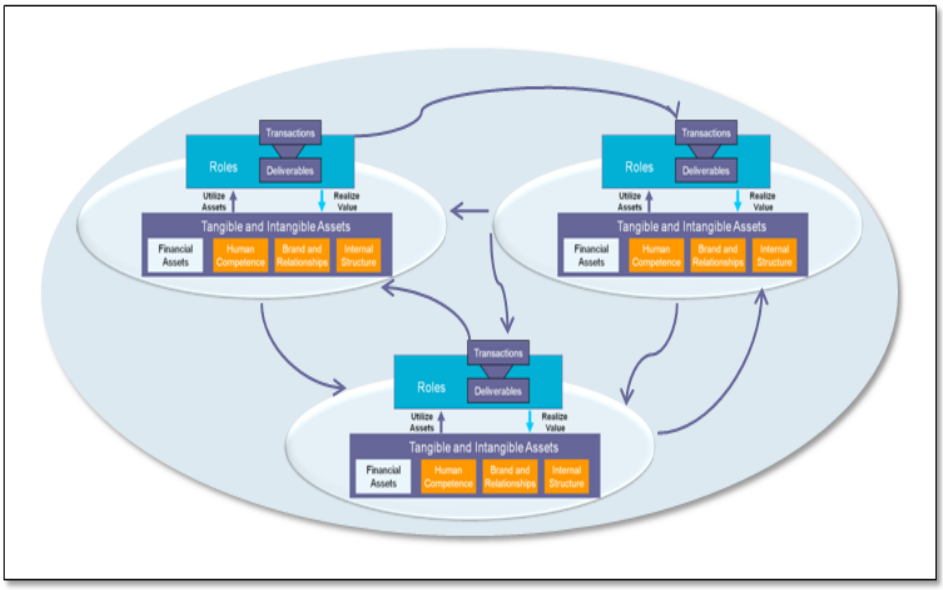


Figure 3.2: Value Creating Network

3.3 A more organic approach

This approach is compatible with living systems theory as the pattern of life itself is the network. Certainly organizations, as social systems or networks behave more organically then mechanistically, (although many of the management practices developed in the age of industrialization appear to assume otherwise). The pattern of organization in a living system is consistent with that of an autopoietic network. An autopoietic network is one that continually reproduces itself through exchanges with the environment that are both cognitive (intelligent) and material (matter and energy).
Value network modelling therefore assumes that the basic pattern of organization for business is that of a network of tangible and intangibles exchanges. Tangible exchanges equate to flows of energy and matter. Intangible exchanges, such as knowledge, point to cognitive processes and intelligence. Describing a specific set of participants and exchanges allows a detailed description of the structure of any specific organization or web of organizations.

3.3.1 A Question of Identity and Resourcing

Individuals increasingly have multiple identities or roles that they play. As individuals we have roles that we play at work, at home, as a parent, as a family member, as member of different community organizations. The workplace also demands that people play multiple roles as work becomes ever more collaborative and networked. However, contemporary Human Resource (HR) practices typically fail to recognize this multiple role aspect of work. This will necessarily change as methods such as VNA and SNA make these key collaboration roles more visible.

Regional Development Agencies seeking to support business networks and efforts in regional development are struggling with the same issue. Traditional ways of approaching joint work or project tend to fund and engage at the institutional level rather than the actual role or even the network level. There is simply no simple way to resource an entire network directly. Institutions and organizations, however can serve the network through the roles they elect to play in the network – or by providing infrastructure or resources to support others in playing roles within the network.

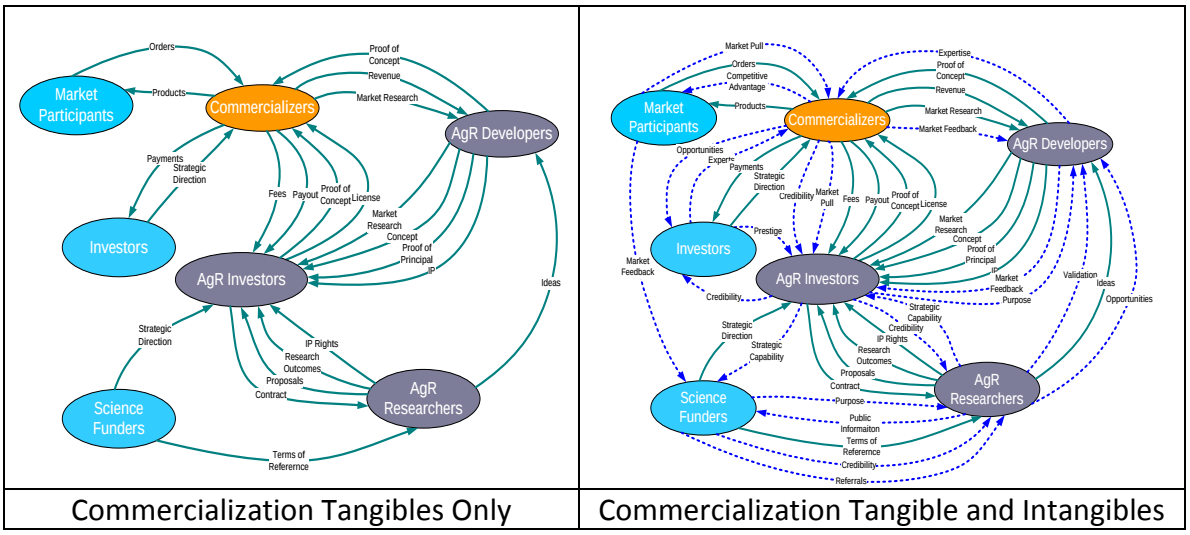
When roles are not clearly defined and resourced in the network there is confusion between the network roles and institutional roles. Further, there may be other (sometimes competing) organizations playing the same role that can cause friction if the network role is not clearly defined. When the network itself is made visible, roles and specific exchanges can be negotiated far more quickly and the network itself can be monitored for effectiveness.

3.3.2 Doing Networks deliberately instead of intuitively

Value Network Analysis helps people work with network in a conscious, defined and rigorous way. People intuitively know how to network – it is the whole foundation of human society after all. But if people want to support purposeful value creating networks then making those networks visible and applying carefully crafted indicators can provide insights for developing effective network interventions and strategies.

A Value Network Analysis begins with describing contributing *roles* and *value transactions* visualized as a graph or map. Nodes represent roles, and directional arrows between nodes describe each critical tangible or intangible deliverable in the network. Typically solid lines indicate contractual, *tangible* revenue generating or funding related *deliverables* and their flow paths. Along with those, dashed lines show the critical *intangible* or informal deliverables such as knowledge exchanges and benefits that build relationships and keep things running smoothly.

Take an example. Referring back to the commercialization network describe in Figure 1. The example is from AgResearch in New Zealand, a government agency that helps commercialize scientific discoveries through collaborations with researchers, investors and commercializers. It is clear that modelling the formal process transactions provides only a limited view of what really happens in this activity. When it can take several years for a discovery to make its way to market, what really keeps the process moving are the intangible human-to-human interactions that must be supported and managed just as effectively as the formal contractual activities. Value Network Analysis enabled AgResearch to better support this network activity, reducing time to market, increasing the flow of innovation and improving stakeholder relationships.



Commercialization Tangibles Only	Commercialization Tangible and Intangibles

Figure 3.3: AgResearch Commercialization Network – Two Views

3.4 VNA in Regional Innovation Networks

In 2007 an evaluative study "*Effectiveness of ICT RTD Impacts on the EU Innovation System*" was conducted for the European Commission, DG INFSO Evaluation and Monitoring Unit, by ALTEC SA and Edna Pasher PhD & Associates (Allee et al 2007a and 2007b) under the direction of Peter Johnston, Head of Unit, and Frank Cunningham, Evaluation Specialist. The aim was to assess how effectively EU ICT RTD and deployment initiatives are being exploited in European systems of innovation at member state and regional levels.

For this evaluation a base set of Intellectual Capital indicators were identified and applied at both the regional and national levels, drawing from established practices in Intellectual Capital and the Skandia Navigator model (Edvinsson and Malone 1997). The Intellectual Capital (IC)

framework provided a set of indicators based on five focal areas: 1) financial capital, 2) market capital, 3) process capital, 4) human capital and 5) renewal and development capital.

In the workshop most members of the audience were interested in the idea of measuring SNA-VNA network interactions as a means of measuring strength, durability and reliability of regional networks. However they were rightly critical of the specific indicators selected in this study because they relied on widely discredited Eurostat indicators like R&, patenting and lifelong learning, which are not measures of innovation *per se.* Maybe the best that could be said was that they were kind of proxies as European (EU) intellectual capital indicators
This was, in fact, one of the issues for Allee as well with this particular study, although the basic framework and categories of capacity building are not so controversial. Although future work would need to carefully consider specific capacity building indicators, the study nonetheless did demonstrate that Value Network patterns could be linked to capacity building as well as social and economic outcomes.

3.4.1 Stages of Innovation in Regional Value Networks

The EU regional innovation value network research revealed network patterns of typical roles and interactions occurring across FP6 projects. From these basic patterns four specific types of purposeful value networks were identified and categorized as noted below. The value network patterns archetypes are important for two reasons: 1) each archetype generates a Value Network Intellectual Capital Profile (or capacity building profile) based on its typical deliverables and beneficiaries; and 2) The four value network archetypes each support a particular stage of innovation from conception to implementation in the form of commercialization or production.

Note that in the diagram below the roles are the same at each stage. However, they are activated very differently and the nature of the interactions is also quite different at each stage. What we are learning from similar work with companies is that these “phase changes” in the network are typically handled very poorly, especially since the continuity of knowledge flows are so critical. It is also worth noting that the four stages roughly correspond to Figure 4.3 The IOCC-framework (Wallin, 2006) wherein Johan Wallin describes the four stages as Initialization, Operationalization, Crystallization and Commercialization.

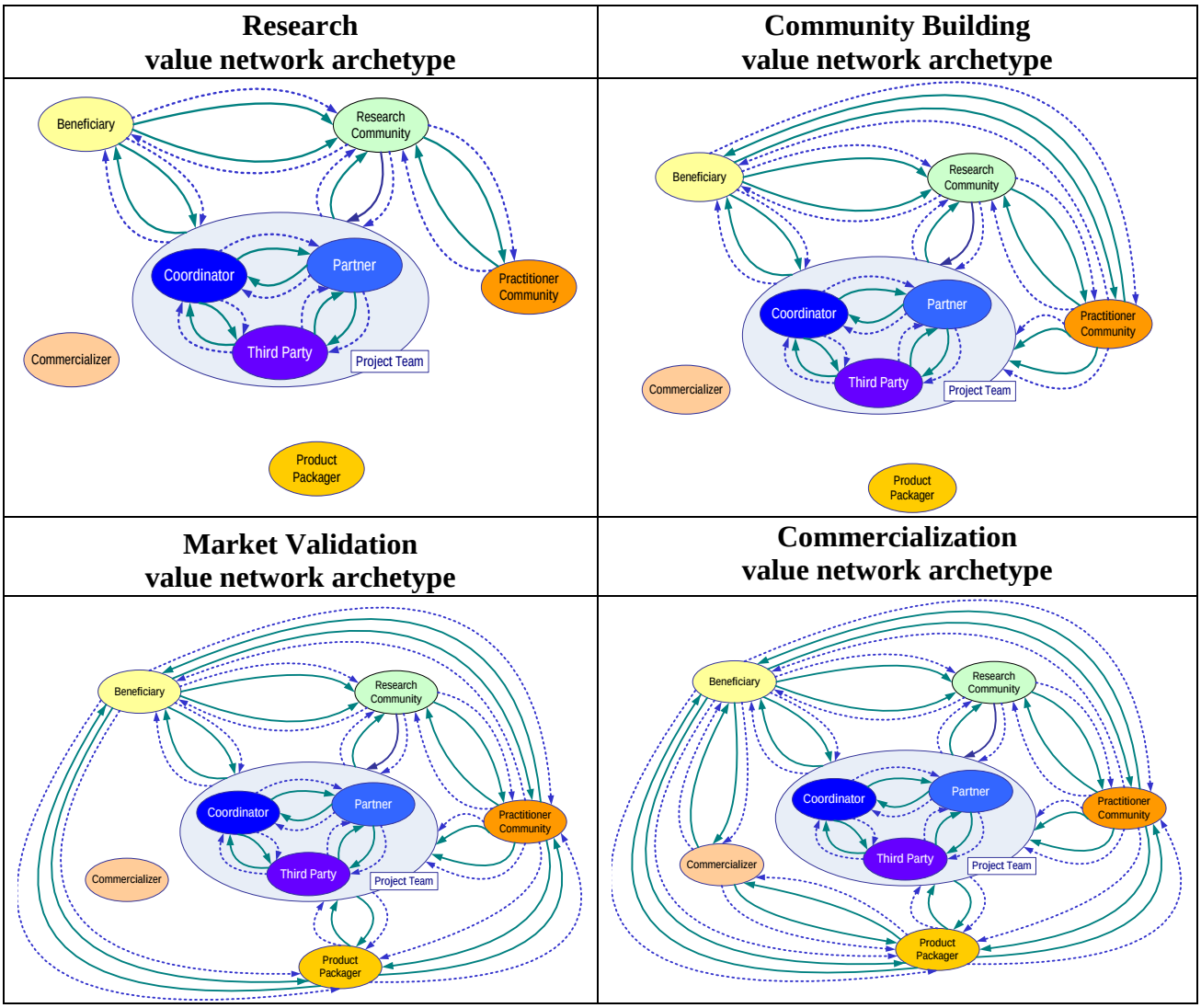


Figure 4.4: Network Archetypes of Phase Changes in an Innovation Network (Allee and Schwabe2008)

The category of Research was chosen where the *primary* aim is to produce research results or an innovative product. The category Community Building was chosen when the aim of the project is primarily coordinated action or building a network or a community of people sharing a common interest or common task. The Community Building value network shown in Figure 4 logically builds on the efforts of a Research archetype, although it also could be a precursor to launching a research project. The Market Validation category was chosen when the product or the result is well defined, and the project goal is to test and validate market or beneficiary readiness. Commercialization involves actually bringing the product or result to the market or implementation through production and distribution. The Commercialization value network in Figure logically builds on efforts

of a previous Market Validation value network. It then ‘closes the circle’ through exchanges between the commercializer and the beneficiary.

3.4.2 Implications for Regional Development

The practical implications of this work for regional development is that mapping and monitoring value network patterns provides a way to assess regional performance in terms of value created by network activities within a given value constellation. Assessing value network patterns of knowledge sharing, cooperation and connectivity within a region, provides a way to make these networks more transparent so that people can more deliberately negotiate and provide resources and better define benefits to organisations taking part. Value network patterns link to specific value conversion activities and capacity building for project partners as well as to the innovation capacity of the region as a whole. As a dynamic data-driven modelling method it can also reveal critical failure points and systemic risk.

The practical implication of this work is that Value Network Analysis provides a possible solution to one of the most challenging business issues in the intangibles economy: describing and monitoring the role of intangibles in value creation. Many acknowledge that the greatest portion of business value lies in intangibles. This problem is especially intense in government, civil society and nonprofit organizations and business networks. In these cases value impacts are exceedingly difficult to describe in only tangible or financial terms. VNA offers a scalable method for understanding the dynamics of intangibles and value creation at virtually every level of complexity from shop floor and business networks to regions and global networks.

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4 Business Orchestration for Regional Competitiveness by Johan Wallin

Globalization, global warming and the financial crisis are issues that pose political decision makers with the oxymoron of business leaders telling them, that governments have to make more regulations, so that they as business leaders can act in the long term interest of the society. This is quite different compared to the recommendations put forward by Michael E. Porter arguing that government should not interfere with individual business sectors (Porter, 1990).

In practice, governments have for long been involved. For example Ireland has tried to improve its competitiveness through what can be called a proactive type of government intervention (Lawton, Innes, 2003). This means focusing on identifying key individuals within an industry or cluster, and strongly supporting initiatives generated by these individuals. In Ireland this intervention has had a number of key characteristics: the government's use of purposeful strategies, an organizational focus, emphasis on the relationships between key organizations and actors, and ambitions to provide the infrastructure for subsequent network development.

This paper presents reflections on the question of how governments can support regional competitiveness. The paper proceeds as follows. The next section presents a framework for how clusters emerge, and some suggestions for the role governments can take to support the growth of clusters. The third section elaborates upon what the role of the orchestrator is during the different stages of cluster evolution. The fourth and final section discusses orchestration and the policy landscape.

4.1 About cluster evolution

Clusters emerge in what could be described as a lifecycle model. This model consists of four phases, initialization, operationalization, crystallization and commercialization (Wallin, 2006b).

4.1.1 Initialization

In the initialization stage there exist some emergent or dormant resources that are recognized by one or more individuals to possess the potential for a

growing business. For example in the early 1970s the telecom sector in the Nordic countries was fortunate to have (i) a semi-regulated environment, (ii) the possibility to export technology thanks to strong international companies like Ericsson and Nokia, and (iii) a jointly agreed policy: the NMT-mobile consortium. The evolution leading to the strong position of Sweden and Finland in the mobile telecom sector was thus a gradual development taking place over many years.

During the very early stage of the formation of a cluster the government support seems to take place in the form of the provision of favorable conditions for businesses to prosper. Historically most clusters have emerged without explicit cluster-specific support from the government, but the support has been more of providing a favorable infrastructure in the way Porter suggests (Porter, 1990), focusing on nurturing national competitiveness through shaping factor conditions, demand conditions, related and supporting industries, and securing firm rivalry. This is how for example the Finnish telecom cluster emerged. Nokia could benefit from being located in a partly deregulated market, and having access to talented engineers thanks to a strong educational system.

4.1.2 Operationalization

Once the first ideas gradually become firmer, there is a growing group of individuals that share the vision of a future business potential. At this stage there is a need for some deeply committed individuals to bring the ideas further and make sure that the first commercial offerings will get launched. During the operationalization phase these individuals enable and nurture the cluster formation process. Governments or regional authorities have thus to support particular organizations and even individuals that possess the potential to provide such commercial breakthrough. What is needed is to get a group of committed actors to simultaneously pursue some degree of coordinated development activities, which over time would lead to the formation of a genuine cluster. The ambition is to create positive network effects, by focusing on the context and conditions for favorable competence development to occur within the network. At this stage the question is primarily about bringing the right people together. The way such an orchestration set-up can be formed within a network is illustrated in Figure 4.1.

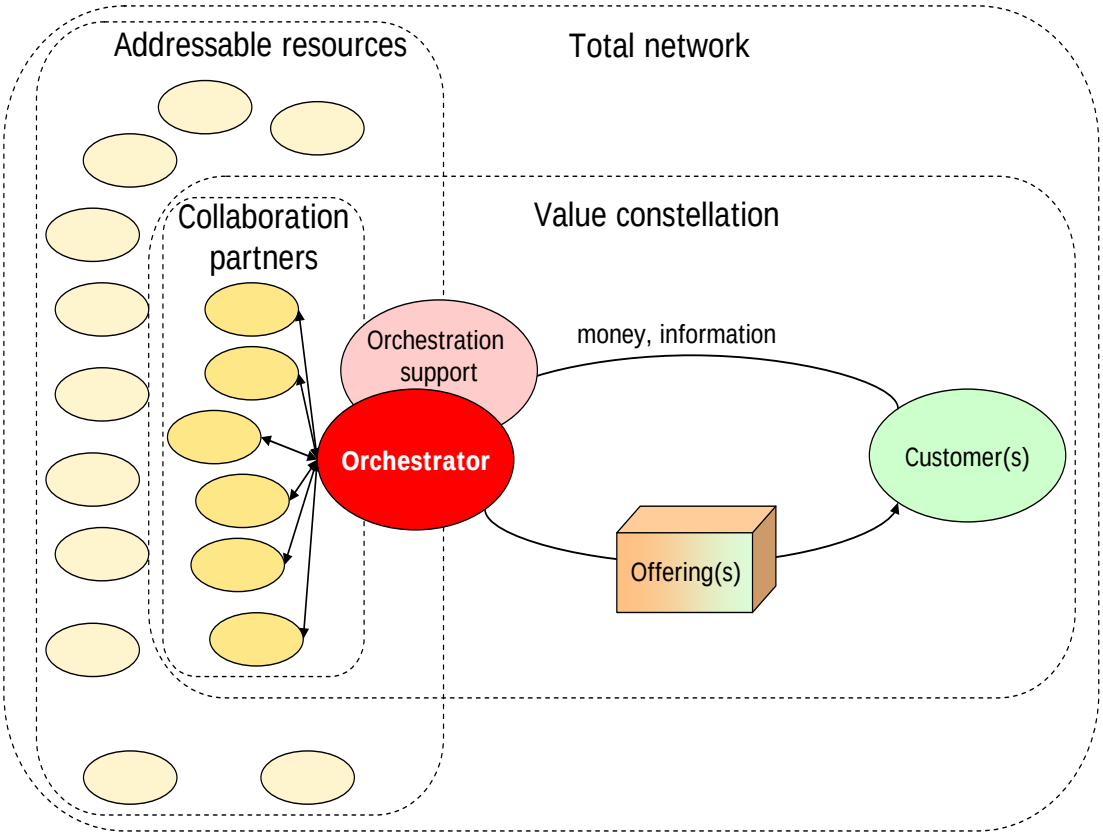

Figure 4.1. Orchestration in networks

4.1.3 Crystallization

Once the cluster is established, then the government has better possibilities to apply more focused support. For example in the 1990s the Finnish government was heavily promoting the telecom sector, which was the primary sector getting governmental funding for research and development. At this stage the focus is very much on shaping the industrial competitive context, and developing institutional attractiveness for the region or nation. A good example is the way the Finnish government actively lobbied for the agreement on the 3G-standard (Ramírez, Wallin, 2000). How this process unfolds is illustrated in Figure 4.2 by using the Dierickx and Cool (1989) notion of knowledge stocks and flows.

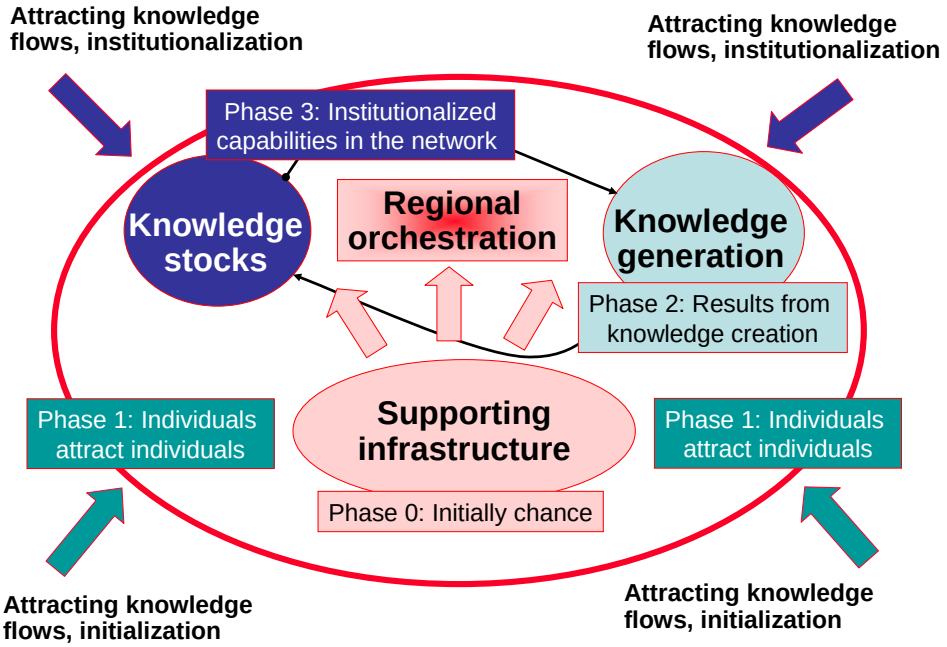

Figure4.2. The stage-wise accumulation of knowledge in a regional cluster

4.1.4 Commercialization

When the industry matures, this can pose a challenge on the government. A good example is how governments have had to deal with the crisis of the car industry both in North-America and in Europe. As the competitive context and business logic changes, the government is stuck with its geographical span, whereas the large industrial champion increasingly is putting its attention to areas outside the home turf. For relatively small economies with large, mature industrial champions there is no clear recipe. The way Europe has dealt with the crisis of the car industry suggests that the relationship between the government and the mature cluster has to be developed in a quite pragmatic way, balancing the needs of the global company on one hand, and trying to leverage as much as possible upon the national legacy of the company on the other hand.

How the four stages form a framework for cluster evolution is depicted in Figure 4.3. This IOCC-framework suggests that cluster evolution ultimately is an innovation process. On a very crude level structure follows strategy. Once the offering is clearly defined and the actions for how to build a business around that offering starts, then the structure will be adapted to the strategy. However, at the very early phase of the innovation cycle, then individuals count. Ideas will only be generated by individuals and identifying and stimulating the right ideas is the bottleneck of the innovation process. On its most atomistic level strategy making is consequently about *insights* (Hamel, Prahalad, 1994), and structure is about *individuals*. If we start from this atomic level, then we can state that any innovation ultimately can be traced back to a single individual with a particular insight. Starting

from this level, any innovation process therefore is an emergent phenomenon.

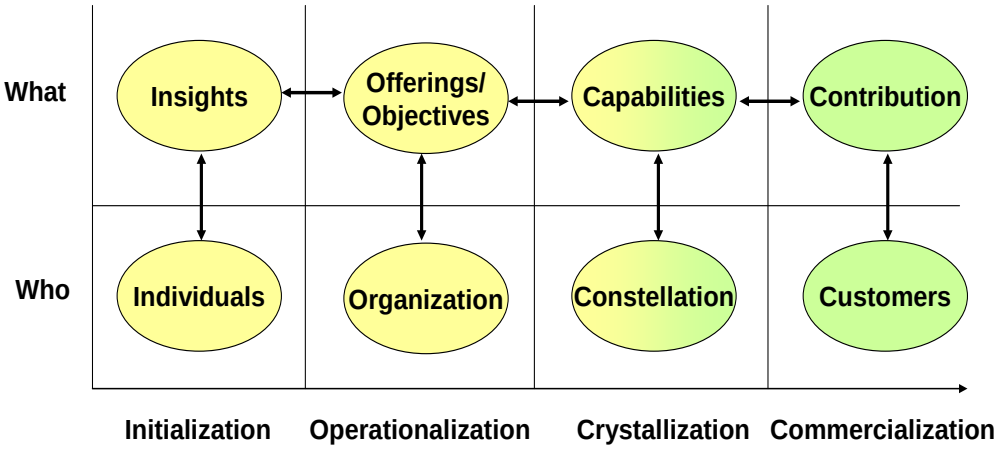

Figure 4.3. The IOCC-framework (Wallin, 2006)

As we can see from Figure 3 the cluster evolution model can also be observed from another perspective: how the innovation process takes place as an organizational phenomenon.

At the very early stage of the formation of a cluster the governance is very much based on self-organization among a small group of individuals. During the operationalization phase there is an increasing amount of coordination, whereby one or several individuals systematically start to orchestrate needed resources in order to be able to design, develop and provide the sought for offerings. In the crystallization phase the behavior becomes more industrialized, and network efficiency becomes paramount to secure large scale competitiveness. Finally, in the commercialization stage the role of individual companies dominate, and in most cases some of them may develop into industrial champions, starting to form their own ecosystems, which may or may not have divergent ambitions compared to the original ambitions of the companies united in the cluster. For example in Finland the telecommunications cluster strongly attached to Nokia in the 1990s have lately seen relatively strong divergence of interests. Nokia has got more interested in its development in important markets such as China, India and Brazil, compared to actively supporting domestic cluster development in Finland.

Common to all four phases is that they have to be focused on how the cluster is able to provide competitive offerings, which generate revenues, growth and job opportunities. When co-producing offerings become the focus of shared activities, then the main question is how capabilities (Sanchez, Heene, 1996, Helfat, Peteraf, 2003) are combined within constellations (Normann, Ramírez, 1993) to produce these offerings. So from a company perspective the notion of cluster is not a relevant unit of analysis, but it is the value constellation, the specific configuration of a

number of actors providing a specific offering, which is of interest. The nodal company, the orchestrator has to find ways to unify the objectives of a multitude of actors and convince them that collaboration is beneficial. For the government in turn, the objective with the intervention is to increase the likelihood that such value constellations would be formed more frequently, and with higher success rates than if no governmental intervention would take place.

4.2 Orchestration and cluster evolution

Taking the perspective that government in certain occasions can provide value by actively getting involved in cluster formation then the key question is how this engagement should take place. Combining the orchestration (Figure 4.1) and IOCC (Figure 4.3) frameworks raises the question of how orchestration is carried out during the different stages of cluster evolution.

Four types of orchestrators can be identified: promoters, architects, auctioneers and conductors (Wallin, 2006). In the initial formation of a cluster the role of the orchestrator is to be a promoter, engaging others to join the common initiative. During the operationalization phase the emphasis shifts into architecturing, as it is necessary to agree upon the common roles and responsibilities among the different stakeholders to operationalize the collaboration. Crystallization means that the joint value creating activities are tested in the market place, and the orchestration task is the one of an auctioneer, trying to convince the customers to buy the offering. Finally during the commercialization stage the work becomes increasingly industrialized, whereas the orchestrator has to resemble a conductor, making sure that everybody is playing the same tune.

Considering the above alternative orchestration contexts it becomes clear that the government in very few instances can act as the orchestrator. However, it can indeed support the orchestrator during the different stages of cluster and ecosystem evolution. The only stage when the government may take the orchestrator role is during the very early stage of forming a new cluster. One example is the way the Finnish government is trying to support the development of new environmental technologies.

In the summer of 2007 the Finnish government, through its innovation agency Tekes, initiated a technology program called BioRefine. This program has a budget of €130 million for the period 2007-2012. The program intends to promote businesses based on biomass and biomass refining, new value-added products, technologies and services, as well as energy production integrated within industrial processes or products.

The goals of the BioRefine Technology program are:

- To develop innovative new products, technologies and services based on biomass refining

- To strengthen and expand existing biomass expertise in energy and forest industry
- To promote the cooperation between companies from different industrial clusters
- To activate small and medium-sized enterprises to work on niche products and markets
- To promote the commercialization of developed biomass products and technologies
- To build business competence
- To support pilot projects and demonstrations

One potential contribution from the BioRefine program would be to clarify the future customer requirements to guide the participating companies in respect of which capabilities to focus upon. If the program would be successful the activation of small and medium-sized companies would then identify the set of actors that possible could form a core group of actors that later on could more independently start to build their own ecosystem and start to jointly develop solutions that would be internationally competitive. As the cluster doesn't actually yet exist, there is initially a need to create a certain level of trust among a large enough number of companies that would see the potential of forming a joint effort as more promising than trying to develop an independent individual strategy. The BioRefine program can here be a catalyst for this process, and would then naturally also form a platform for further networking and clustering to take place.

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5 Leadership and governance in regional innovation systems by Markku Sotarauta

5.1 Introduction

In many policy-making arenas, actors are taking pains to find ways in which to transform old institutions so as to make them fit better the emerging economic order that is fairly commonly labelled as the knowledge-based economy (Cooke 2002). And indeed, in the various regional development and innovation policy arenas, in Finland and beyond, there is a whole bunch of energetic but puzzled, active but confused people who aim to influence the course of events to ensure a better future for their regions. Often they understand clusters, they know the importance of industry–university interaction, they have been taught to respect innovation systems and to build them, but what they have not been given much advice on is how to do it all. The most difficult question in these efforts often is not what should be done, and why, but how to do it all - how a fragmented group of actors, resources, competences, ideas and visions can be pulled together, how people can be mobilised, how a new perception concerning the region and its future can be created for needed changes – who and/or what organisations are capable and respected enough to do it. This is particularly true in a more self-reliance-orientated regional development context that has a strong belief in endogenous development models and knowledge dynamics.

Consequently, network management, or leadership in networks, in this context is not a black box only for practitioners but for academics, too. In regional development and innovation studies, we tend to forget that it is always easier to find out the elements of success or failure in retrospect than to find new development paths for the future and new modes of action in the middle of uncertain and open-ended situations. It is always easier to say that social capital, networks, innovation systems and/or clusters are important for regional economic development than to actually build trust, manage networks, develop systems or construct clusters.

In this paper I briefly discuss the nature of governance and especially leadership as well as capabilities needed in leading the complex processes of regional development. I do not touch such key concepts as regional innovation system, innovation platform or orchestration as they are more extensively covered in the other contributions of this volume. This paper is an honest compilation of previously published articles (Sotarauta 2005; 2009; forth.; Sotarauta & Kautonen 2007).

5.2 Governance

There is a growing support for the view that in regional innovation systems are based on an interactive process between firms, various public or semi-public development agencies and research institutions. Consequently, there has been a move away from understanding policy-making as a decision-making and planning process proceeding from policy design to decision-making, and finally to implementation, towards comprehending policy as a multiagent, multiobjective, multivision and pluralistic process, in which the actual policy is shaped continuously. In this kind of process, such questions as what is to be done, and how, are constantly negotiated and communicated in various forums.

'Governance' is concerned with co-operation transcending various borders, takes many goals into consideration and consists of constantly evolving combinations of teams according to different situations. Governance also recognizes and acknowledges that many activities have shifted from formal organizing to more informal networking, and therefore network negotiation and co-ordination can be confounded by the political context in which they are embedded. Governance can thus be defined as self-organizing, inter-organizational networks that are characterized by interdependence between organizations. Interactions in these networks are game-like, rooted in trust and regulated by the rules of the game negotiated and agreed by network participants (Rhodes 2000, 61). As Hirst has pointed out, complexity and interdependence embedded in modern governance raises two crucial questions: first, "how to create an at least minimally effective division of labour in governance, one that will link together a complex of very different bodies that, even in combination, cannot be considered to be a 'political community'", and second, "how to ensure at the different levels within this division of labour an effective presence of democratic voice – so that the actions of a body at one level do not systematically negate decisions at another." (Hirst 2000, 25)

In terms of governance issues in innovation systems, previous research has identified different types of regional innovation policy ranging from decentralized bottom-up modes of action to centralized top-down modes of co-ordination (Howells 2005). Especially in the comparative analyses of regional innovation systems and policies, the concept of multi-level governance has gained ground (Cooke et al., 2000; Cooke et al. 2004), shifting attention towards the interrelationships between administrative levels in a multi-layered context. This need has arisen due to the nation-state falling under pressures 'from above' as well as 'from below' (Bullman 1997). Decentralization and regionalization have been strategic responses from nation-states to these pressures. The need to shift attention is also raised by Hill and Fujita (2003) by showing how cities are embedded in multilevel spatial and institutional configurations.

As key concepts, especially multi-level governance but to some extent also governance are still in a state of becoming. For example, fairly often multi-level governance simply refers to different administrative levels and structures (local, regional, national and transnational) of policies that are emerging (see e.g. Kitagawa 2005). However, there seems to be a clear need to analyse more deeply the roles that different players have in complex development settings and multi-layered innovation systems. Additionally, it seems to be obvious that increased complexity and rapid pace of change demand more from people responsible for regional development and regional innovation systems more specifically at various levels of activity. I believe that the more complex situations are, the more regional development is dependent on the leadership and network management capacity of key individuals.

5.3 The nature of leadership in RIS

In European regional development and innovation studies it has for some reason been almost habitual to neglect the role of individuals. There is a long tradition of studying structures, collaboration, learning and institutions, for example, which are relevant topics indeed. Consequently, for me, leadership appears as an important but understudied topic.

Of course, leadership always raises conflicting views; it is quite easy to underrate its significance by arguing that regional development cannot be led, that it is a result of many forces, or that it is impossible to identify leaders who really make a difference. This is, of course, the nature of regional innovation systems as a whole, but it does not imply that leadership would not play any role. It is also quite easy to overemphasize the role of leadership by giving some leader(s) all the credit, thus mystifying leadership and reconstructing the old-fashioned notion of a leader as a "talented and visionary individual" who controls and provides his followers with a visionary direction. This is naturally an overly simplified dichotomy but discussions on the role of leadership in regional innovation systems easily drift along these lines, even though reality is much more diverse.

Our empirical studies from Finland, Norway and Denmark show that to promote change a standard manoeuvre is to establish a high status core group to manage the change process (Sotarauta & Bruun 2002). More often than not the constitution of these groups is based on the personal relations of the policy initiator(s) who actually set the problem and development agenda. This is not big news; the news is that new forms of interactive and networked forms of governance have made policy making not only more flexible but also fuzzier. The border-line between elitist growth coalition that hides itself behind a rhetorical wall and dynamic motor of wider mobilisation is fine indeed. The true nature of these kinds of growth coalitions is hard to detect and, here leadership studies might do us some

good. All in all, the significance of core players to shepherd and mould complex policy processes has become even more central than before.

Additionally, the case studies on economic transformation of Tampere (Sotarauta & Kostiainen 2003), emergence of bio concentration in Turku (Bruun 2002) and ICT minicluster in Jyväskylä (Linnamaa 2002) indicate that in spite of fairly large and open participation only few people have actually been able to see the entire playing field, make sense of it and hence to lead the fragmented and heterogeneous bunch of organisations to pool their resources and competences for something bigger. This requires a good capability to operate simultaneously at the crossroads of several playing fields, i.e the game is played with several ministries, municipalities, universities, firms, citizens groups, etc. To build a functioning regional innovation system the need to mobilize individuals from different walks of life with different knowledge and/or resources of power if formidable and, the need to pool their knowledge is a challenge indeed.

Influencing regional innovation system in a modern governance setting is more or less an interdependent process. It consists of individuals, coalitions and their capabilities exercised in interaction to achieve joint and/or separate aims (see Bryson & Crosby 1992 for a discussion on shared power). An effective promotion of, let us say digital media in a city, requires in-depth understanding and knowledge of the substance of digital media; it also requires a good view on how general policy processes and specific policy processes of that field come together, what their dynamics are, who the key-people are and how issues can be pulled through the multiple chain of decision-making. In addition, somebody should know how people think in this field, what the driving forces of firms, researchers, and other key players in the field are, and what the right measures in building networks are in this specific field and how they can be linked to wider development efforts to gain more power. Therefore, to achieve results a development process needs to be, one way or another, shared. No one can master all the pressures and all of these spheres of knowledge alone.

According to our studies, policy actors can be classified under three overlapping categories: policy generalists, persons of substance and persons of process understanding. At best the first have a spread of general policy interests for a region, good perception of trends and their significance and a high level of strategic awareness; the second have deep knowledge of respective business area and the last are likely network managers who are able to take care of carrying interactive processes. For example, the first group consists of politicians, mayors, chief executives of local and regional development agencies and municipalities as well as ministries, i.e those people whose job it is to have a comprehensive view over entire region or an issue in question. Policy generalists are able to locate possible partners, identify various institutional obstacles and, carry the lead ideas cross the many institutional and organisational boundaries to final solutions. They

have, or at least should have, a helicopter view on issues. What they usually do not have is a specific understanding on more substantial matters. The second group represents a specific understanding on substantial matters but, more often than not, they lack political vista. They are not good at, or perhaps not even interested in, manoeuvring through a jungle of interests, organisational ambitions and administrative levels. The third group represents those people who do not have required skills, position and/or power base to work cross the institutional boundaries at higher levels. Nor do they have deep enough education for specific substance fields but they often understand the nature of human interaction; they are able to convene people and find common grounds for very different actors with different backgrounds.

To be able to influence regional development events, leaders have to act in the riptide of several different interests and aims and find a totally new range of different means to be applied in different events. On the other hand, a good leader has always known how to act in a complicated field of activity, mastering several different operational environments, interests, people and issues simultaneously. Leaders have also earlier been able to sense what different people need in different situations; therefore they have been able to act as required by the situation. They have also earlier known how to build networks, to involve new actors in networks, to negotiate funding, and to capitalize on state funding, for example, through skilful tacking. The knowledge economy as an environment, however, requires that more and more people have a more developed strategic in-built sense of the regional development game than earlier.

So far I may conclude that leaders are individuals who have followers and who are capable of influencing their followers to produce results; thus they transform the region and/or enhance its adaptation to the changes in environment. To be able to carry through all this, leaders should be trusted, they should have vision, and they ought to build an organization so that their followers would be able to clarify the vision communicated by the leader. As Heifetz (2003, 225) states, a major challenge of leadership is to draw attention and then deflect it to the questions and issues that need to be faced. To do this, one has to provide context for the action and a story line that gives meaning to action. The followers need to comprehend the purpose of adaptive or transformative measures so that it focuses less on the person and more on the meaning of the new action, and thus they need to be actively involved in the sense-making process.

However, in regional innovation promotion processes only a small fraction of the actors influencing development has been assigned the task of promoting regional development in one way or another. Some of the actors participate in various development efforts through their own interests, simultaneously having an indirect effect on the development of the region; some do not participate at all in collective action, still influencing the course

of events. Now we might also ask whether all those people who with their followers influence the course of events in some region are leaders, whether only those people whose mission is to transform the region can be defined as leaders in our context and whether they are leaders only if they produce results. What if somebody has a formal position and an official mission in the promotion of regional development but does not produce any results; is he or she a leader or not? What if somebody has no official role whatsoever, but he or she still influences the development? In addition to elaborating intentionality and formality of leadership, we also need to revisit such basic issues as leaders and followers as well as the role of vision; they may have quite different manifestations in regional development from corporate practices.

Leading regional development requires that leaders are capable to lead not only within the boundaries of the organizations and communities that authorize them, but they consciously aim to reach organizations and communities across the boundaries to reach such spheres in which their actions and words may have influence despite having no authorization. In regional development leadership is not a straightforward question of leaders and followers. To be a leader, an actor should be able to influence the actions of other organizations, and thus also the actions and decisions of other leaders. Leaders lead some issues but are often followers in others, and some of the followers may in some other occasion be leaders. In this kind of context leadership may be seen as the effect of actors on one another; it may be that in the promotion of regional development there are several leaders having different qualities. At all events, leadership in regional development is more or less an interdependent process, no one can lead the development process, or even some fragments of it, alone (if at all). Consequently leadership is here seen as shared and/or dispersed. It consists of individuals, coalitions and their capabilities exercised in interaction to achieve joint and/or separate aims, consciously or unconsciously.

5.4 Dynamic leadership capabilities for regional development

In a setting briefly discussed above creating a competitive advantage drawing upon strong innovation capacity and distinctive knowledge pools generally requires the ability to make good use of resources, that is, many kinds of capabilities. I argue that even though policy makers nowadays increasingly promote expertise and a learning-based knowledge economy, they have not been able to improve their own capabilities to meet the new demands. The dynamic capabilities are both implicitly and explicitly embedded in many development processes and directed toward enabling or disenabling economic change and evolution. These capabilities enable the region as a whole to reconfigure its resource base, to adapt to the changing environment and to develop as an attractive hub *vis-à-vis* the chosen flows. I suggest, as Teece et al. (1997) have done for the firms, that in connection

with leadership, the dynamic capabilities approach is promising both in terms of future research potential and as an aid to the development network endeavouring to gain competitive advantage in the increasingly demanding environment.

Teece et al. (1997) define capabilities as the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments. Therefore they see dynamic capabilities as reflecting an organization's ability to achieve new and innovative forms of competitive advantage. Dynamic capabilities emphasize management capabilities and inimitable combinations of resources that cut across all functions (Lawson & Samson 2001, 379), and in regional development they include, for example, building infrastructure, facilitating R&D, founding new development agencies, creating and brokering networks, and developing human resources. The main argument here is that successful regional development policies as a whole call for a set of capabilities; regions ought to enhance these capabilities and foster leadership to be able to utilize the available resources and create new ones.

I argue that by focusing more on conscious development of dynamic capabilities in the context of regional development it might be possible to better identify and utilize resources, and in addition, to create new resources and hence to improve competitiveness. Next I elaborate on the dynamic capabilities needed in regional development in more detail on the basis of the model presented in Figure 5.1.

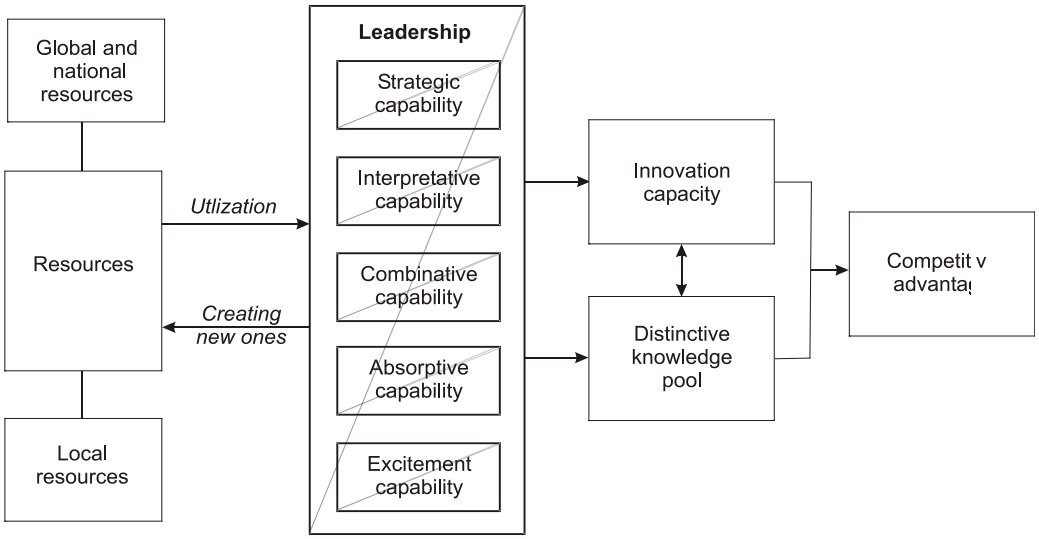

Figure 5.1. The capability model for regions

In the knowledge economy it is increasingly recognized that knowledge and capabilities are distributed across a set of heterogeneous actors, and much has recently been written about collective learning and its role in regional development. In regions, the quite a common policy response of the 1990s and 2000s is to try to combine strategies of many actors to attract additional

resources and expertise in knowledge-intensive activities, with learning strategies targeted at a variety of groups within the region. One of the main tasks of the leaders engaged in the promotion of regional development is to create functioning development networks and to mobilize resources and expertise both internal and external to the region in question. Therefore in utilizing resources and creating new ones *combinative capabilities* are needed. I distinguish three types of combinative capability: institutional capability, networking capability and socialization capability. (see more in detail Sotarauta 2005.)

It has been recognized that absorptive capability is essential in strategic adaptation in which both adaptation to changing environment and strategic choices of an actor play a significant role. It includes, for example, the ability to value, assimilate and apply new knowledge and to transfer vision and strategies into action; in this kind of processes also *interpretative capabilities* are of utmost importance (see Lester & Piore 2004). The mental model, cognitive map, development view, whatever we call it, is an important factor in regional development, since in a certain sense we live in a world of mental models made up of thoughts, ethics, ideas, concepts, images, memories, plans, and knowledge among other things. Actors do not react directly to reality but to internally constructed perceptions of reality.

Strategic capability refers to the ability to make decisions about what to focus on in regional development in the long run, and thus to set the strategic direction for many development efforts. Slightly more specifically it can be summarized that it includes, among other capabilities, a) the ability to define strategies and visions for regional development in a collaborative process, b) the ability to bring to the fore visions of different futures and the ability to transform these visions into focused strategies and action, c) the ability to transform crisis situations into something constructive, d) the ability to launch processes right as well as to manage and lead them persistently in different phases, e) the ability to find correct timing for development work and seize the competitive advantage by being a pioneer, and f) the ability to bring forth big objectives so that they seem credible and attractive for the other actors. Also the capacity for bold and fast strategic decisions in the community is important in opening opportunities for a new path. If successful, this capability may be institutionalized in the community and become a local pride and an essential part of the local culture and form the core of development and decision-making capability of a whole region. Previous successes or failures either strengthen or weaken the capability to make bold decisions.

Leaders need to be able to generate creative tension that makes people interested and motivated in development work and thus to a create sense of urgency. As already mentioned above, often the formulation of a vision or a development programme and, for example, receiving EU-funding provide a development network and a whole region with a false sense of security. To

avoid this pitfall, development efforts require the sense of drama that can be found in a crisis, possible crisis, great opportunities, charismatic individuals, etc. What is essential here is the ability to arouse people's interest and motivation. It helps if key actors in the regional development work are regionally well-known and respected individuals, because the combination of enthusiasm and authority that they embody is likely to transmit a positive and regionally anchored view of the project to the general public. Visionary leadership and concentration of representative authority in the regional development network should be balanced with openness, transparency and goal consistency to guarantee the credibility and educational self-renewal of the network as sources of creative tension, i.e. exciting and inspiring processes that attract highly skilled individuals, new knowledge and ideas. Therefore *excitement capability* refers to the ability to capitalize on creative tension between the inspirations of key individuals and the dominant thought patterns, and to the ability to excite the actors to "development rebellion"; all this requires a good sense of drama.

Excitement capability includes a) the ability to create and utilize creative tension in development work, b) to create the sense of drama (presenting issues so that people become enthusiastic and excited), c) the ability to get short-term success to sustain motivation in the network, and d) to motivate people to participate in various development efforts.

5.5 Conclusions

The knowledge economy needs its institutions and structures; nevertheless, it also seems to need brave and visionary individuals and innovative networks formed by them to get things done. The basic message of this paper is that a more explicit focus on leadership, individuals, dynamics of the networks and the dynamic capabilities is needed in the often quite muddled and complex fields of regional development. The new complexity cannot be controlled, as was believed earlier, but it can be put in good use, and here the question how influence is gained in modern governance emerges as crucial. People who can "see the entire playing field" and make sense of many complementing and conflicting issues, instruments and actors simultaneously are of importance. The other actors, structures and institutions, of course, influence their actions and hence the relationship is reciprocal.

All this means that the capabilities of the leaders and policy makers should be continuously developed so that they would be able to see different things as "stakes" in regional development and to utilize them in co-operation with other actors. It is also important to note that focusing on capabilities does not refer to a functionalist view on development or on investigating which organization should have which capabilities. Rather the question is what capabilities already exist in the region, what is their quality, what are missing, which individuals or what organizations possess what capabilities,

how is it possible to develop new ones and to maintain and strengthen them, and how to channel capabilities to enhance development.

Leaders, as defined here, are not to be mystified and reconstructed as talented and visionary human beings who control and provide their followers with visionary directions. They are rather shepherds of regional innovations systems with a task to identify their herds, guide and protect them. Governance structures are not consisted of resigned sheep but strong-willed and ambitious organisations and individuals and therefore tending a "flock" requires a profound understanding on reciprocal policy process. "Regional innovation shepherds" usually need to earn their positions in the flock, and a right to influence its activities. In this article mobilization, awareness raising, framing, co-ordination and visioning between visions were identified as key processes to gain influence. So, having influence in regional development is not about control and a command type of action. It is about changing the way in which people see the world, so that they would *voluntarily* turn their attention, decisions, and actions towards actions, collective and separate, which would benefit both the region and themselves.

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6 Matrix policy – rationales and good examples by Phil Cooke

6.1 Introduction

Co-evolutionary modelling seems to have been boosted in recent years where research has focused on transitioning beyond the fossil fuels-based industrial paradigm towards a more knowledge-based 'Green Economy' embracing renewable energy, smart recycling and other clean technologies as dominant forms of production and consumption. These do not simply happen but are a product of the interaction between innovation and regulation. Any transition to a 'post-hydrocarbon' paradigm will, it is argued, occur first in experimental market 'niches' (e.g. solar) that evolve into 'regimes' (solar, wind & biomass/biogas) where, say, renewable energies together challenge hydrocarbons in the market. A weakness is there is no 'spatiality', yet we know some regions lead, others lag. Consider the niche-regime-landscape Transition Model below (Fig. 6.1), in light of the simple explanation above.

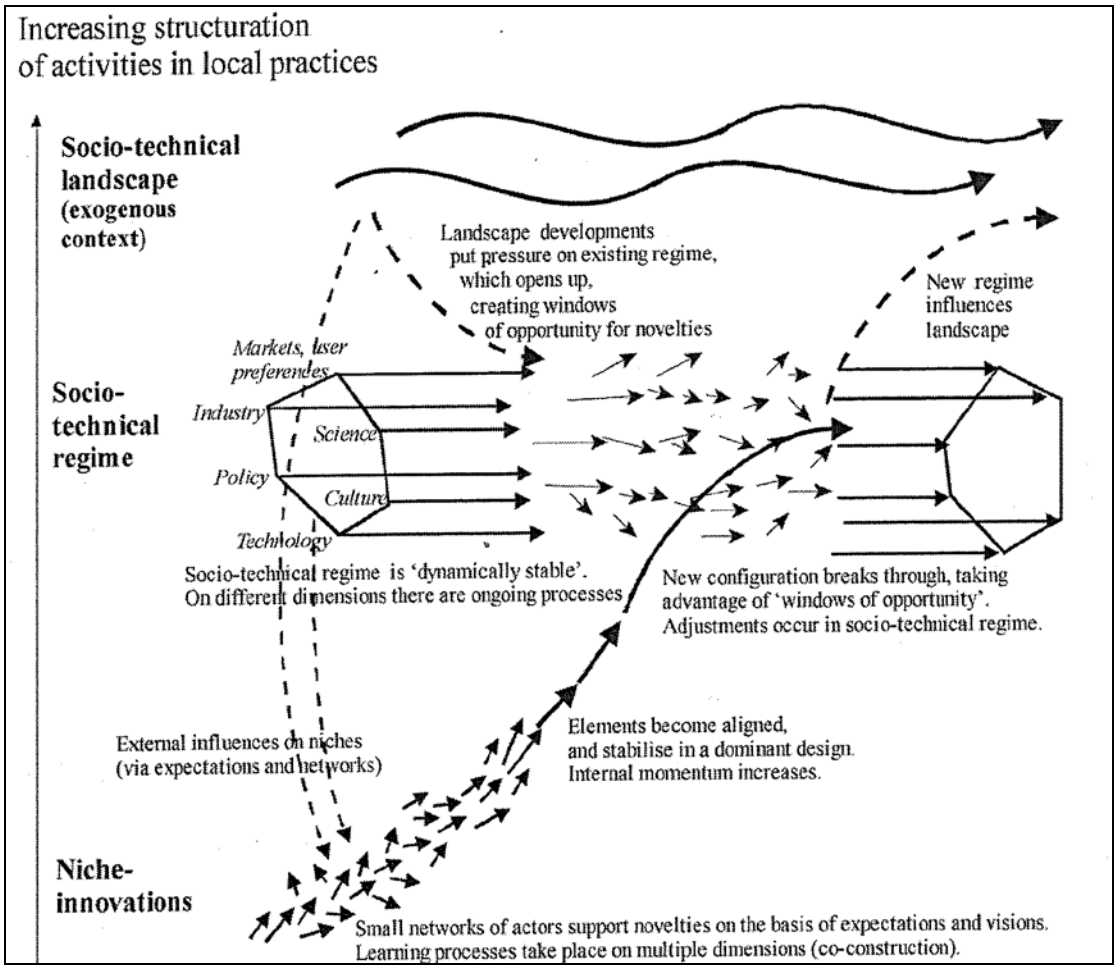

Fig. 6.1 A Co-evolutionary Transition Model: Niche>Regime>Landscape

6.2 Knowledge Economy, Platforms & Transition Regions

Regulation can assist or impede development of niches and regimes. Ultimately, society, economy, politics and S&T co-evolve to express a new 'socio-technical landscape' where, say, global warming is mitigated by pervasive clean production and consumption based on renewable energy and clean technology. The idea of 'Transition Regions' has been introduced to explain the economic geography of this. An example of a Transition Region is shown in Fig. 6.2. It has the following key institutional and niche/regime characteristics:

Knowledge-based production & consumption (i.e. regional community long informed and responsive to sustainability issues)

Decentralised, demanding customers for non-fossil fuel energy (municipalities own CHP stations)

Related variety in low energy, high efficiency engineering (Pipework, wind turbine, photovoltaics, biogas, biomass, specialised KIBS consultancies etc.)

'Aggregator' capabilities (i.e. 'orchestration leadership' – after Johan Wallin) to systems-integrate producers to meet orders

Reflexivity, i.e. regional consciousness and 'branding' as network: 'Innovative Network: Flexible District Heating' ('leadership')

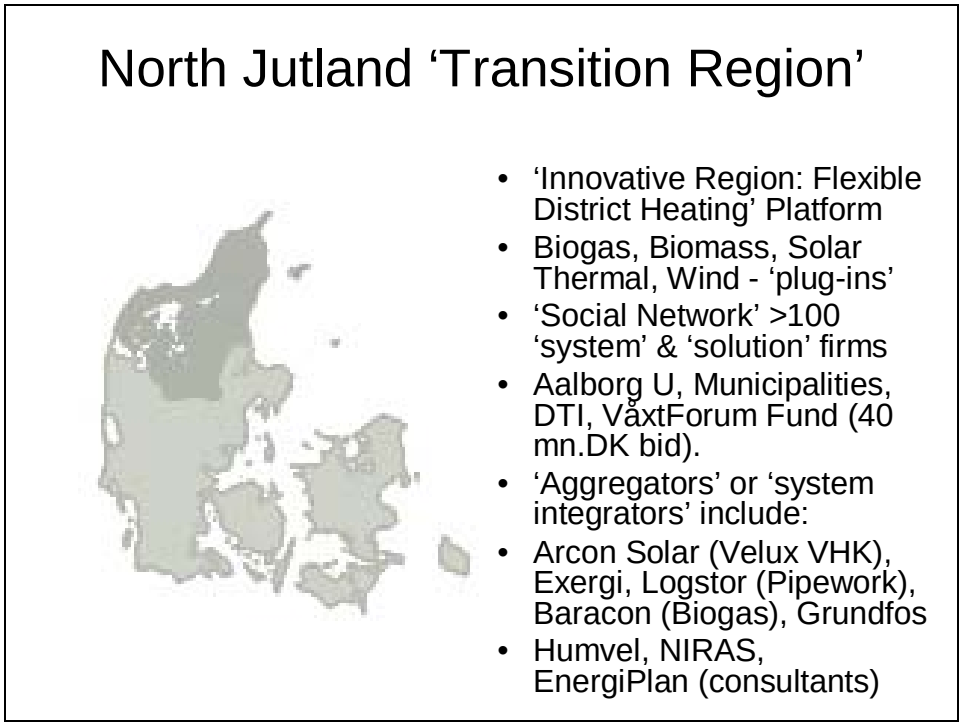

Fig. 6.2: Transition Region, Knowledge-based, Flexible Green Energy

Transition regions may occur in relation to other combinations of 'related variety' economic activities. An example is the Rogaland region of Norway, centred upon Stavanger. Here energy is also key to Stavanger's prosperity in the form of offshore oil extraction and associated engineering. But this was preceded by its fishing, seafood, horticulture and related food production,

processing and cuisine. Each expresses the initial endowments of food and landscape in the region that attracted tourists from the nineteenth century but which has used knowledge-based analysis to modernise the culinary tourism offer. Thus a system platform exists as shown in Fig. 6.3 where the Norwegian Culinary Institute has become a leader in production of globally competitive chefs, many of which open starred restaurants utilising local, often organic and seasonal ingredients from the sea and the land.

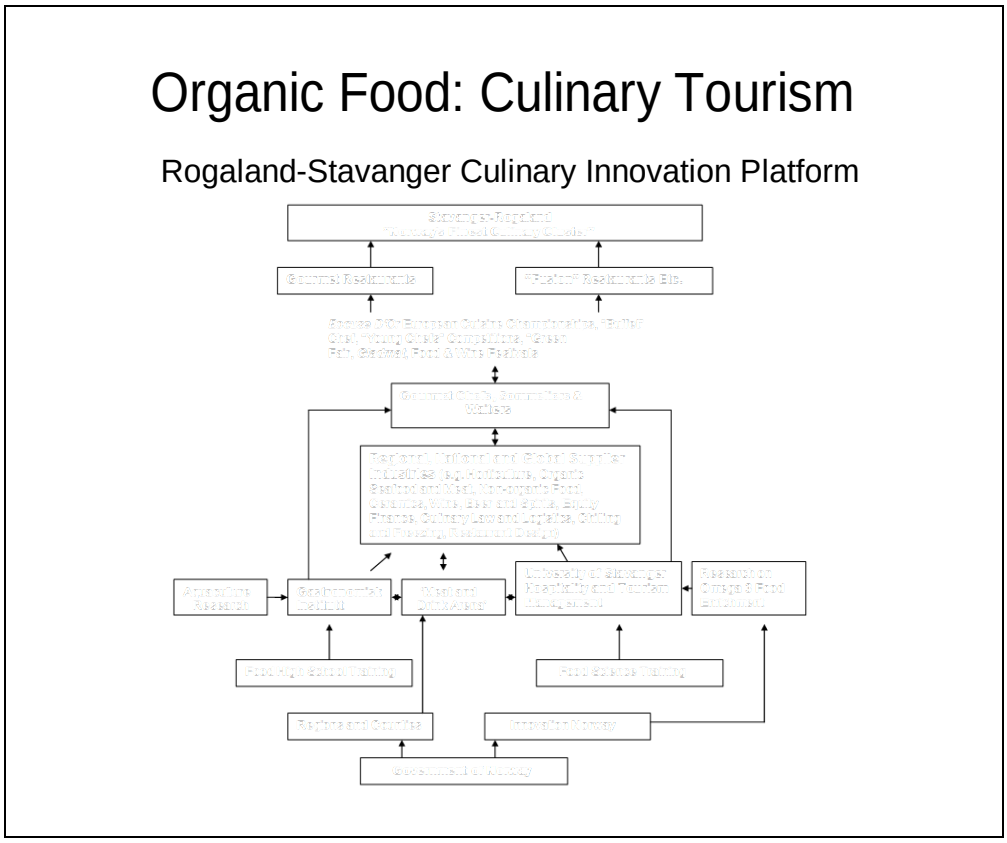

Fig. 6.3: Agro-food, Culinary and Tourism ‘Platform’ in Norway

In a different pair of ‘platforms’ can be seen the manner in which ‘smart recycling’ or industrial ecology brings economic benefits for firms and municipalities through application of modern technical knowledge to ancient urban problems, such as the recycling of toxic waste. In Fig. 9 can be seen two illustrations of this process.

The first example at Kalundborg, Denmark depicts a recycling a waste chain that begins with a coal-powered power station. It is worth noting how closely the diagram for this in figure 6.4 follows the Value Network Analysis modeling method described in section xy, so this perhaps would be more accurately called a waste value network. In Kalundborg, the Asnaes power station provides steam to the Statoil refinery and Novo Nordisk pharmaceuticals plants. In exchange Statoil supplies fuel gas, cooling water and treated waste water to Asnaes. The latter's heated water also warms the tanks of a fish farm, while its waste stream of steam is used for district heating by the municipality as well as Novo Nordisk. The pharmaceutical company, in turn, pipes organic sludge waste to farms to use as fertilizer. Adjacent on Kalundborg's Eco-industrial Park is the Gyproc wallboard factory, which receives surplus fuel gas from the Statoil refinery and scrubber sludge from Asnaes. In return Gyproc supplies condensate back to the power station and sends chemical waste to Novo Nordisk. Power station fly ash goes as an input to a nearby Portland cement factory that also produces industrial metals as a saleable by-product. Sulphur from the Statoil refinery is supplied to the Kemira sulphuric acid plant as an input to fertilizer production. Cooperation between businesses relies on interactions among a voluntary business network in collaboration with regulatory authorities. By 1998, the Industrial Symbiosis agreements had amounted to some $160 million in savings on inputs and waste removal for firms and the municipality.

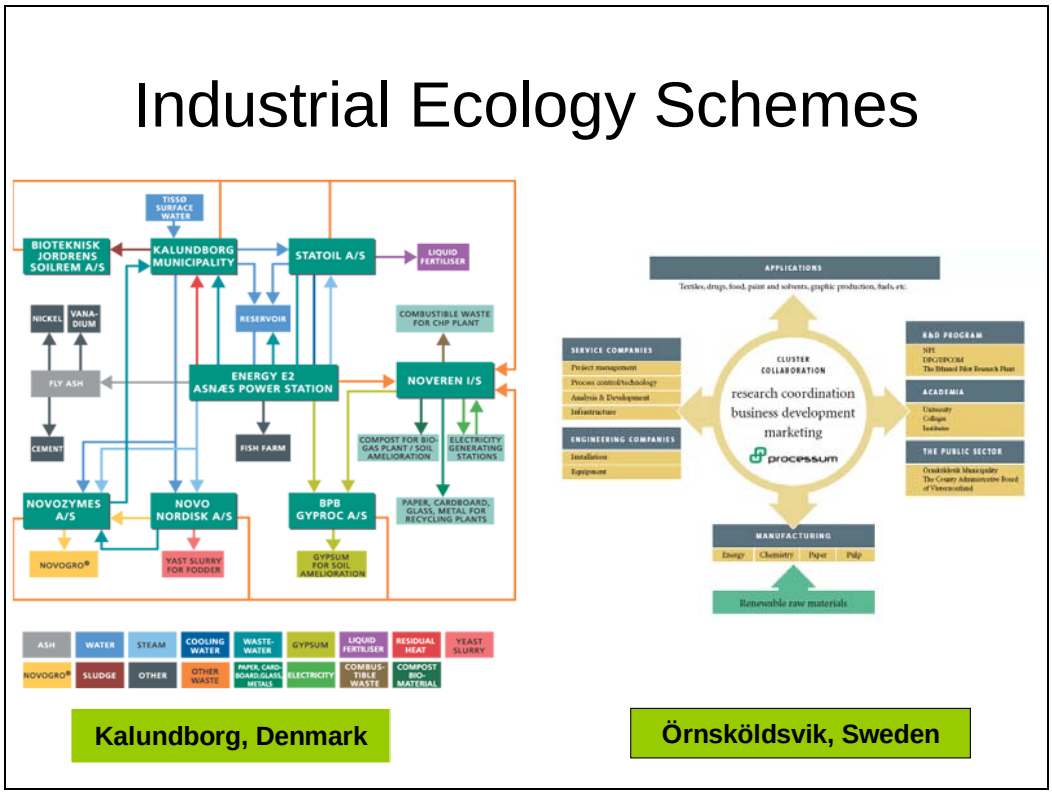

Fig. 6.4: Two Knowledge-based Networks for Smart Recycling

The second example is at Örnskjöldvik, Sweden, where the source of the recycled waste is a pulp and paper mill which typically produces toxic ‘black liquor’. Re-processing this sustains a biochemicals plant, a biorefinery and a bioethanol power plant as well as other installations of varying sizes. The Örnskjöldvik system has received designation as one of VINNOVA’s VinnVäxt regional growth clusters. Key firm Akzo Nobel in 2005 invested €24 million in its Bermocoil plant products from which are used as environmentally friendly thickeners, stabilizers and water retention agents to help improve the properties of water-based paints and building products.

6.3 Territorial Knowledge Dynamics

6.3.1 Traditional Paradigm vs New paradigm

This delineation of some of the key general integrating aspects makes discussion of some Integrating Framework findings deserving of discussion at this point (Fig. 6.5). This portrayal is more focused specifically upon the

transition from a traditional paradigm of Innovation and Proximity to a Territorial Knowledge Dynamics (TKD) type new paradigm, which is nevertheless compatible with the broader Knowledge Flows Policy Model in Fig. 12 below. In Fig. 6.5 the first column defines a sector or cluster-type of practice focused upon innovation. This then transitions into more of a platform-type interaction described in the second column involving less

	Traditional paradigm: Innovation and Proximity	**New paradigm: Territorial Knowledge Dynamics**
Unit of change	Innovation	Knowledge dynamics
Mobilization of new knowledge	Punctual (technological trajectory)	Permanent
Knowledge articulation	Cumulative trajectory	Combinative dynamic
Territory	Spatial division of activities/labour	Multi-local knowledge networks
Regional Governance	Regional coherence between use and generation of knowledge (cluster policy)	Capacity to take part in multi-local dynamics and anchor mobile knowledge

Fig. 6.5 Transition to Territorial Knowledge Dynamics (TKDs) Paradigm

specialised and vertical knowledge dynamics. Knowledge exploration, examination and exploitation are more pervasive in the new paradigm than the old. In the latter exploiters had to await R&D lab outcomes in most cases, while feedback and learning are less linear in the new approaches. This is particularly relevant for the discovery of Cumulative Knowledge & Innovation which has been traditional for sectors and even clusters (although clusters may be precisely 'transitional' forms) and Combinative Knowledge & Innovation Dynamics typical of the emergent and evolving 'platform' knowledge flows model. This, it will be recalled, is based on 'related variety' of inter-industry knowledge spillovers and lateral absorptive capacity among firms. Whereas intra-corporate spatial divisions of labour placed routine assembly industry at peripheries and management headquarters in core-regions, knowledge dynamics under knowledge economy conditions are multi-locational, distributed and innovation is more 'open' because cognate to norms associated with public 'open science' than in the older, 'closed innovation' model. Accordingly, regional governance moves away from the localised 'container' model of knowledge geography

even associated with clustering towards distributed knowledge platforms with pronounced ‘global antennae’

6.3.2 Knowledge Capabilities Model

Fruitful as the evolutionary concept of related variety of industry elements is, it is a still a static conceptualisation. Basically it says, if you have related variety, evidence can be found that your region grows faster than if you do not. But it does not explain how related variety evolved or how it evolves if the region lacks it. Thus related variety needs a dynamic dimension. This arises, importantly, from its contribution to ‘absorptive capacity’. Absorptive capacity is fundamentally a knowledge concept referring to the ability to value, assimilate, and apply new knowledge. ... In an increasingly knowledge exploiting economy, economic geography has to take growing absorptive capacity and its contribution to innovation increasingly seriously. In this effort there is little ‘geography of knowledge’ theory to draw upon. This must be constructed from appropriate concepts from neighbouring fields to economic geography like theory of the firm, international trade theory, organization theory and the like.

Moreover, since the leading edge of research in respect to innovation is evolutionary theory, the focus of this shall be the neo-Schumpeterian strand of evolutionary economic geography. However, Schumpeter left little or no spatial legacy in his theory of economic development so to overcome this means connecting to the Veblenian ‘cumulative causation’ strand as practised by the likes of Myrdal and Hirschman though they had little to say about knowledge. Nevertheless, Hirschman did have interesting things to say about innovation, at least in its technological dimension. Consciously connecting Schumpeterian theory into his own thinking about regional evolution, he noted that Myrdalian ‘spread’ would be driven by the innovative capacity of competing technology users while ‘backwash’ would concentrate important linkages in dominant centres. This is interpreted, conceptualised and successfully tested in several of our ‘knowledge economy’ studies. Primate and other large cities cumulatively concentrate knowledge-intensive business services (KIBS; especially finance and professional or ‘producer’ services) while high technology manufacturing (HTM) evolves as satellites to KIBS centres clustering at distinctive scientific knowledge and innovation (SKI) nodes. The spatial knowledge dynamics of this require conceptual disentangling. This is done in Fig. 6.6 by connecting regional knowledge capabilities to other endogenous and exogenous dynamising elements.

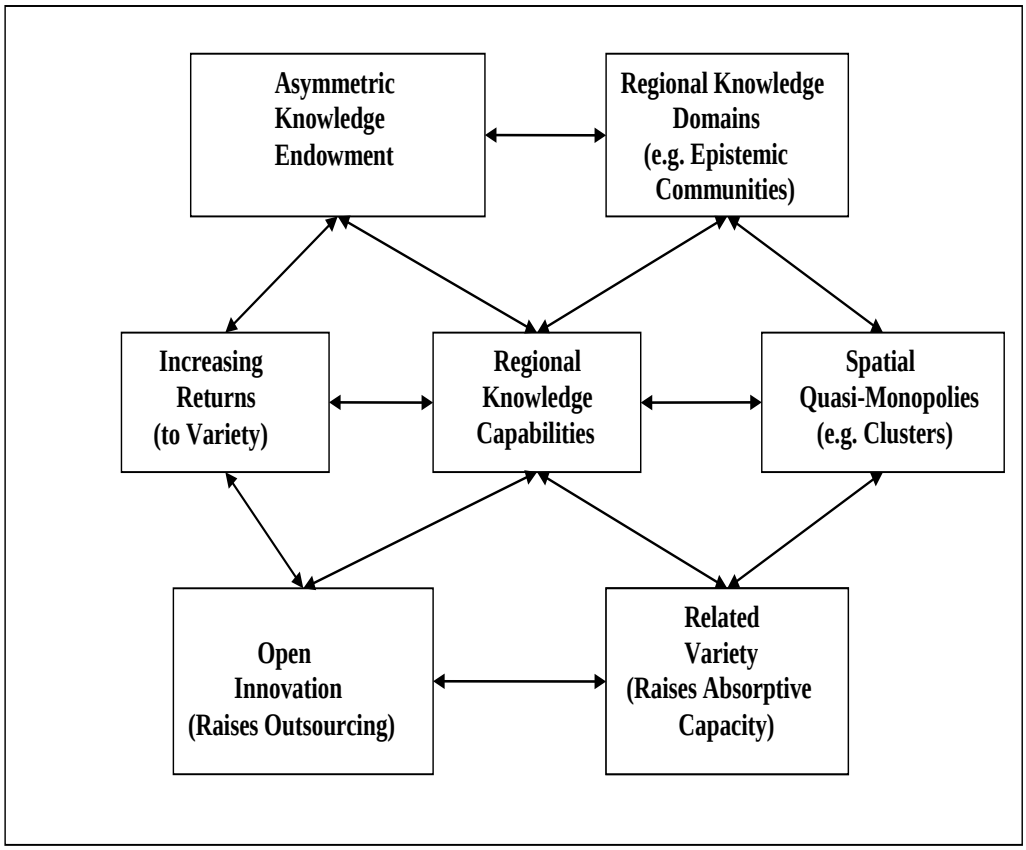

Fig. 6.6: Knowledge Capabilities and Economic Geography: A Theoretical Framework

Regional Knowledge Capabilities

Fig. 6.6 is an attempt to propose a model of regional evolution under strong 'knowledge economy' conditions, embracing the neo-Schumpeterian and Veblen-Myrdal-Hirschman strands of evolutionary economic geographic theory. We start from the centre of the diagram with "Regional Knowledge Capabilities", denoting a region in which a mix of widely in-demand knowledge capabilities evolves, for example in the broad SKI platform of life sciences.

How does this happen? Geographic knowledge emergence, like platform emergence is only beginning slowly to reveal glimmers of understanding, also more about innovation than knowledge. Scientific talent in well-resourced knowledge centres conducting high impact, 'ahead of the curve' research is crucial as 'evolutionary fuel' in fields like life sciences.

Creativity plays a comparable role in relation to symbolic knowledge. Such knowledge may not be exploited immediately or even by its explorers. But if it is, it gives an opportunity for commercialisation by entrepreneurs having translational absorptive capacity to turn knowledge into innovation. Thereafter Schumpeterian 'swarming' by second-comer imitators and adapters builds critical mass. For less science-based industries like wind-energy turbines, as in Jutland, Denmark the global leader, knowledge of optimisation of efficient and effective power through a medium - earth, water, air - possessed by manufacturers of ploughing equipment and marine propellers in proximity were crucial to design of modern wind turbine blades and the resulting north Jutland renewable energy platform (see above, Fig. 6.2)

Asymmetric Knowledge Endowment

Connecting to north-west in the diagram, and compared to other regions, this 'Asymmetric Knowledge Endowment' box expresses a region's asymmetric knowledge endowment from a variety of knowledge organisations and institutions, advantaging the region. Exploration knowledge organisations, such as research institutes, knowledge networks among individuals and knowledge leadership figures (e.g. possible future Nobel [or Oscar] laureates) co-exist with examination knowledge equivalents for standard-setting, trialling, testing and patenting, and exploitation knowledge bodies such as entrepreneurs, investors and related professional talent.

Increasing Returns by Variety and Related Variety

The evolutionary fuel is supplied (linking westward in Fig. 6.6 to "Increasing Returns by Variety") by the attraction of a variety of imitative and innovative talent to the region. Such a Schumpeterian swarming realises increasing returns to "Relted Variety" r (south-eastward diagrammatic connection) where innovation may move swiftly through various parts of the innovation platform.

Related variety nourishes absorptive capacity because cognitive distance between platform sub-fields is low. This is an important, geographically coalescing, part of the evolutionary spatial process. Talent includes entrepreneurs as well as innovators, who bring routines learnt in other industries or knowledge of unsatisfied demand from those other industries that the new knowledge may be capable of satisfying thus accelerating regional evolution. These transferred routines or perspectives can result in spinout firms, a key dynamic in platform emergence and evolution and a key form of combinatory knowledge. Entrepreneurship opportunities of this

kind are particularly pronounced when processes of regime-change or the disarticulation of dominant discourse occur, as outlined in the introduction and discussed further below.

Regional Knowledge Domains

Moving north-east in Fig. 6.6, these processes result in the presence of 'Regional Knowledge Domains.' The dictionary definition of 'knowledge domain' is a region or realm with a distinctive knowledge base, common principles, rules and procedures, and a specific semantic discourse. This naturally fits well with the concept of the epistemic community with its own professional discourse and interests. Such monopolistic features are frequently characteristic of, for example, platforms that in regional terms may display related variety. An example is the varieties of engineering expertise in the industrial districts of Emilia-Romagna in Italy in a spectrum from Ferrari cars and Ducati motor cycles (both Modena) to Sasib in packaging machinery (Bologna) and drgSystems machine tools in Piacenza.

Spatial Quasi-Monopolies

These and other platform clusters have spatial quasi-monopolistic or 'club' characteristics, exerting exclusion and inclusion mechanisms to aspirant 'members' consequent upon their knowledge value to the club. If such industries operated as markets rather than knowledge quasi-monopolies it is difficult to see why spatial 'swarming' would occur.

Open Innovation

Finally, to the south-west of Fig. 6.6, it is precisely such localised knowledge spillovers that induce 'open innovation' whereby large firms outsource their R&D to purchase 'pipeline' knowledge, and access via 'channels' regional knowledge capabilities. These processes interact in complex, non-linear ways displayed graphically in Fig. 6.6, to explain regional knowledge asymmetries. Variations in the market value of regional knowledge combinations also contribute significantly to associated regional income disparities. Being an evolutionary growth process, successive increasing returns may be triggered from any point within or, of course, beyond the confines of Fig 6.6.

Finally, a recent conceptual development of great relevance for the idea of 'combinatory knowledge' travelling horizontally between clusters or other industrial organizational forms in a platform setting tackles a further weakness in the 'related variety' perspective. In the original methodology, 'related variety' was pre-defined to include industries in two-digit NACE/SIC categories and exclude those in different two-digit NACE/SIC categories. However this is too narrow a reading of the nature of inter-industry knowledge flow dynamics in the knowledge economy.

Accordingly, the conceptual adjustment to methodology to allow for unexpected innovation interactions is necessarily based on the concept: 'revealed related variety'. This is achieved by Social Network Analysis of 'innovation biographies as elaborated in VINNOVA's studies of the international biotechnology industry. Hence, narrow related variety of the more cumulative kind perhaps may still be sought with the first methodology but that can also be done with 'innovation biographies'. The advantage of the first over the second is that econometric modelling of large data sets is feasible whereas it is not unless enormous resources have been expended to build such a data set for 'innovation biographies.'

6.4 Integrated Regional Knowledge Flows & Policy Framework

Through theory and representative empirical materials, transition modelling can thus be used as a lens to capture meta-changes on a global scale as hitherto dominant paradigms begin to be challenged and gradually replaced by elements of a new socio-technical landscape, something we are seeing as the advanced economies experienced the decline of Industry and the rise of a Knowledge economy. Key elements of this contrast are captured below (Fig. 6.7).

There is clearly a shift away from practices of planning industry trajectories as was once done in countries that sought to support 'national champion' businesses. Temporarily, of course, western governments have been assailed by requests from failing industries like financial services, automotive production and electrical goods for 'bail-outs' and other forms of subsidy. Some have been successful, but their fundamental problem is adherence for too long to the old-fashioned Fordist consumption paradigm based on private cars, houses and domestic appliances produced without thought for either changing consumer demand or the fate of the planet. In the knowledge paradigm, policy support is evidently more forthcoming if firms, including banks, adhere to more intelligent loan and investment practices.

Associated with shifts towards less excessive loan terms for consumption are demands from policy-makers for a 'green turn' in production of goods and services. This echoes the further move away from

An Integrated Regional Knowledge Flows Policy Model.

Industrial Paradigm	***Knowledge Paradigm***
Fossil Fuels	*Renewable Energy/Green Knowledge*
Industry Policy - Sectors, Clusters	Knowledge Policy- Networks, Platforms
Closed Innovation (General Electric)	Open Innovation (Procter & Gamble)
Closed Source (Microsoft)	Open Source (Linux)
Disciplinary Science	Inter-Disciplinary
(e.g. chemistry [Mode 1])	(e.g. biochemistry [Mode 2])
Silo Government	Joined-up Governance
Regime/Paradigm Governance	Transition Governance
State De-regulating (e.g. utilities)	State Re-regulating (e.g. banks)

Fig. 6.7: Instances of Transition from Industrial Paradigm to Knowledge Paradigm

corporate reliance upon internal 'groupthink' norms and towards a more 'open-minded' recognition of networked knowledge from science, software and in innovation. The relative power of 'Public Labs' over Corporate Labs is a striking feature of this change in direction and source of key knowledge flows, and regions may become 'Living Labs' for some such 'bundled innovations' as we have seen.

Notice the model is suitable precisely to the context of 'transition' from' Industrial' to 'Knowledge' economy paradigms also that of 'Hydrocarbon' to 'Renewable' energy regimes, and conceivably 'Old KIBS' to 'New KIBS' paradigms (less financial innovation of the 'toxic' kind; fewer 'generous' mortgages and no sub-prime mortgages; separation of 'merchant' from 'plain vanilla' banks, etc., etc.)

6.5 Government, Governance & Towards Policy

The long-mooted evolution of vertically-structured, closed, stand-alone, disciplinary knowledge production, otherwise known as Mode 1 knowledge into the more laterally-connected, open, inter-disciplinary and interactive

Mode 2 knowledge production typifies the manner in which this Industry-to-Knowledge paradigm shift has occurred. Ultimately, though perhaps not yet, such shifts become expressed in modes of administration, notably by government. Citizens and politicians have long-bemoaned the vertical nature of decision-making and information on action practised by government departments still wedded to a closed 'silo' model of authoritative action. The call for 'joined-up-governance' has yet to be fully approached let alone met. However, change in this dimension will have to accompany change in the knowledge and economic dimensions of society. A move from the relative certainties of 'the de-regulated, liberal market' model that has been hegemonic in western countries for 25 years is being faced with huge needs consequent upon the failure of the 'neoliberal experiment' in so many advanced countries. The reluctance of governments to 'nationalise' banks, insurance companies and auto-firms is significant in this respect because it reveals a recognition that in the past such 'patient care' seldom worked well. However,there is high risk in a failure of imagination to evolve policy forms that can deal adequately with 'transition' and the necessary 'transition management' methods implied by the shift to a new, more knowledge-based paradigm involving wholly different forms of more efficient, healthier and sustainable production and consumption.

The shift can also be seen in the varying degrees of integration but, nevertheless, elements of accommodation among different strata of the multi-level governance systems are currently struggling with transition without adequate tools to do so (Fig. 6.8). The EU has shown staggering incapacity to mobilise policy and its core financial strategy (ERM rules) is in ruins in the context of the present financial and economic emergency. Virtually all responsibility for responding to the emergency has had to be taken by national governments who, as we have seen have resorted to 'learning by doing' (i.e. 'making mistakes'). At the regional level, where such authority is seldom found, we find continuing efforts to develop policies on such aspects as environment, planning and economic

EU	Member State	Region
Monetary €/ECB & Co-ordination	Financial intervention	Energy
Agro-food	Business support	Economic Development
Infrastructure/Regions	Training & Skills	Agro-food
Competition Policy	Environment/Energy	Education/Skills

Innovation/S&T	Home/Interior	Environmental Planning
Energy Regulation & Co-ordination		

Fig. 6.8 Multi-level Governance Responsibilities & Priorities in the Current Transition

development for which regions frequently do have some authority and which are important to nurturing niche businesses, and promoting insofar as they can encourage 'regime' change at regional level.

In conclusion, different levels of the policy system tend to have distinctive responsibilities. These rise and fall on the policy agenda over time. In these 'birth pang/death throe' times, as cited from Gramsci by the UK Prime Minister, member-state focus is intensively on 'saving the financial system' and 'business support 'more than 'green transition' or 'creative industries'. Regions may still be quite wedded to 'green issues' also for 'economic development' as they have policy influence there. EU stresses co-ordination and 'concern' for condition of member state and bank finances but ECB is responsible for the Euro. Competition policy is widely ignored. CAP, Structural and Framework funds function but became 'neoliberal' and less Keynesian (e.g. regional policy). In different ways, at all multi-levels, knowledge economy issues (finance, energy, education & skills) - challenge industrial era priorities (industry/sector policies; 'national champions'; agricultural subsidies etc.).

6.6 Implications of the New Knowledge Dynamics Paradigm for Policy

6.6.1 Seven policy implications to contemplate

The main outcomes of the Workshop series for policy contemplation are seven-fold, as follow:

1. Firms, Sectors and Regions are in Transition on Knowledge Flow Dynamics
2. Innovation involves Combinatory and Cumulative Knowledge Dynamics

3. Regions with Opportunities for Combinatory Knowledge Dynamics are Advantaged
4. ‘Related Knowledge Variety’ defines that Advantage
5. Distributed knowledge networks in ‘open innovation’ platforms are key to economic well-being
6. Policy at regional level is in need of focalising on supporting platforms
7. Such platform policies are ‘joined-up’, flexible and involve ‘distributed governance’

Since the first five points are well-covered in the preceding we can briefly explore the implications for policies, especially at regional level here, since the Workshops focused upon knowledge flow dynamics among firms, industries and regions per se.

Let us examine first the nature of regional knowledge policy support. It helps to do this for reasonably maturely-governed regions with democratic assemblies, ministries etc. (e.g. Länder, Belgian regions, Spanish Autonomous Communities, French & Italian regions and UK smaller countries). Resource-allocations and moderate administrative authority allow for significant potential inter-departmental co-operation. Of course, this does not always happen, but it can. We are not here discussing multi-level governance, only in the regional strata. Three such models suggest themselves from the outset: Issue focused Government; Problem-focused Governance; and Platform Governance.

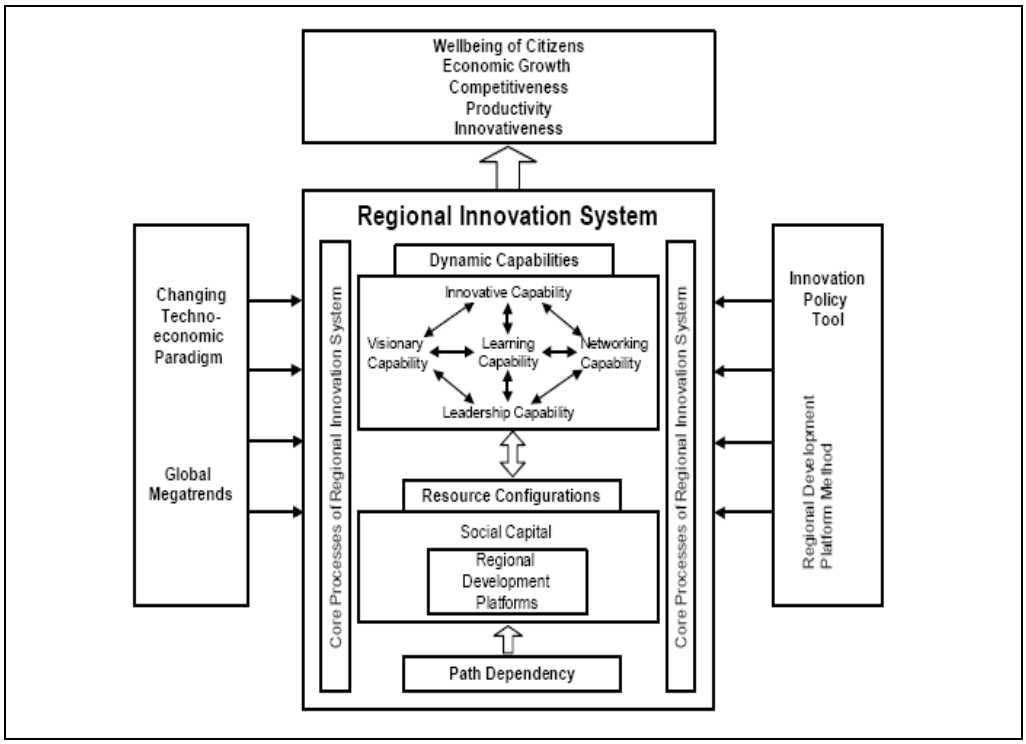

Fig. 6.9 Governance Model for Transitional Conditions

First let us look at some key governance dependencies in the Platform (after Haarmakorpi) paradigm (Fig. 6.9). Then we can consider how in the three models; Issue-government; Problem-governance; and Platform-governance, policy is dealt with in each. For simplicity we take the relevant conceptualised case of a regional governance model where the focus is upon innovation support for industries that have or can be envisaged to have the character of a regional economic development platform. The key government/governance capabilities are the following:

- Visionary capability – influenced by foresight, networks, antennae
- Innovative capability – influenced by dis-satisfaction with status quo
- Networking capability – especially bringing in networked governance
- Learning capability – influenced by openness of internal & external networks
- Leadership capability – influenced by confidence, consensus & capabilities in general.
- Resource configurations – related to envisioned policy prioritisations

- Social capital – of government, platforms, community and policy performance

6.6.2 Issue-based Government Model

Here, in an issue based governmental setting, there will be, by definition, relatively low governance in the modern understanding of external advice, lobbying and pressure of various

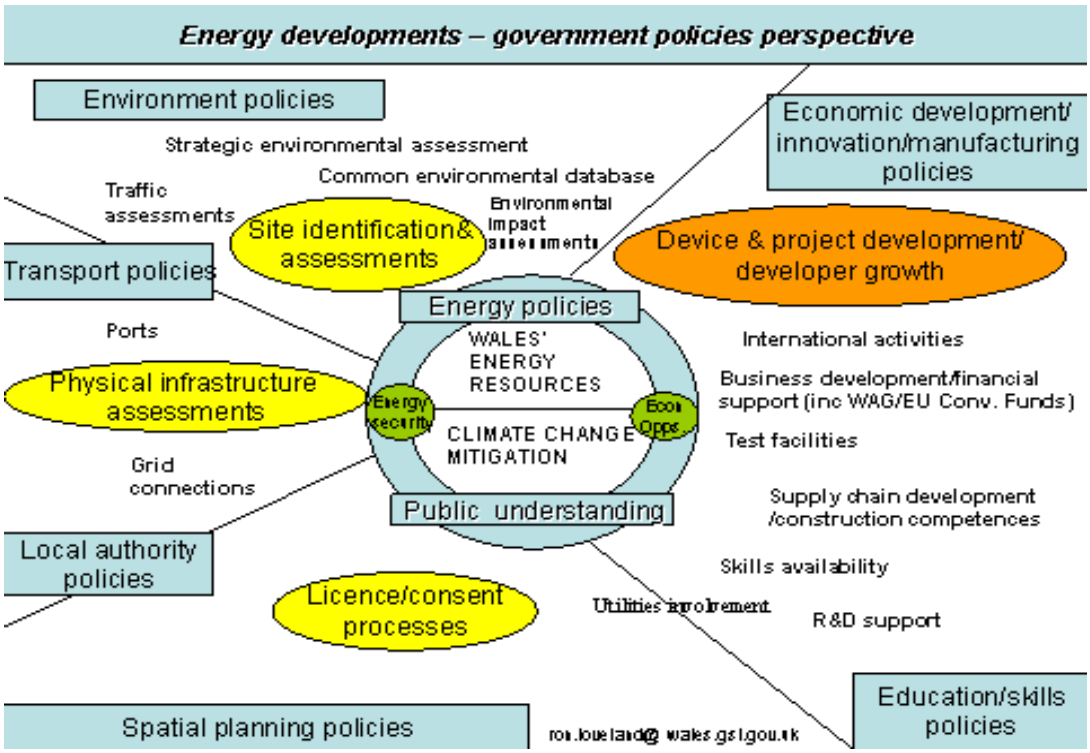

Fig.6.10 Green Policy Joined-up Government Model

networked kinds. Hence, two (networking and learning capabilities) of the seven elements above are immediately removed. This may be a benefit in that various layers of 'participation' are taken out but ability to leverage 'consensus' and social capital are also weakened. Such a model looks rather like the real case presented graphically in Fig. 6.10.

Hence this model depends for functionality upon 'Vision', 'Innovation', 'Leadership' and 'Resources'. Here a relatively constrained regional government, not especially desirous of much 'governance' gets a 'vision' that 'Climate Change' requires policy action, prioritises 'Sustainability' and

does what it can to promote Renewable Energy and ‘Green Jobs’, making strong internal consensus linkage to Education & Skills, Economic Development, Environmental, Energy and Spatial Planning Ministers/Ministries to facilitate its ‘Leadership’ on this issue but with ‘Resources’ accessed in such a way that other stakeholders may benefit from replenishing their programmes in line with the evolving and emergent ‘Green Policy Trajectory’. Hence ‘innovation’ along with much else has been embedded in the same ‘Green Policy Trajectory’. However, there may be external hostility, failure of understanding and significant opposition to and weakening of what is quite a strong policy formation process. The four core strengths may eventually ensure it triumphs.

6.6.3 Problem-focused Governance

This can be exemplified by the scenario, based in numerous distinctive cases from many regionalised administrations in numerous countries, where a core regional industry competence is threatened or actually harmed by globalisation processes, notably cheaper production of the core product portfolio at equivalent or better quality, undermining key markets. Let us assume, once again, a ‘platform’ of such industries with varying degrees of relatedness as found in, for example, engineering regions.

By definition, it is likely that although as a competent government this one regularly commissions or conducts research into its future possible and desirable strategies, these have tended to remain conservatively ‘path dependent’ on ‘more of the same.’ Since we have privileged ‘innovation’ in the examples developed so far, we underline that ‘more of the same’ has meant increasing budgets for research (to the extent the governance system can influence these), perhaps promoting a Regional Science Foundation or Research Council with modest but not insignificant resources. This has been a mainstay to help support regional innovation of the kind Fig. 6.11 calls: ‘Regional coherence between use and generation of knowledge (cluster policy)’. Now, that path dependence has been exposed as misguided. Both Vision’ and ‘Innovation’ as defined are thus absent or largely so since they ‘didn’t see it coming’ and they were ‘satisfied with the status quo’.

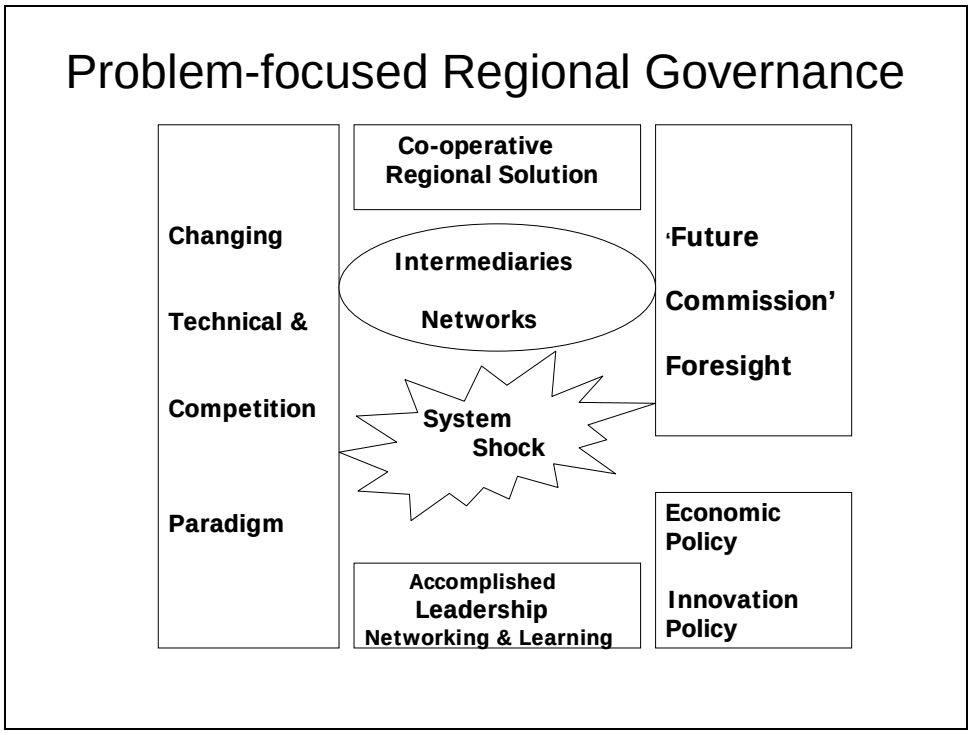

Fig. 6.11 Reactive Problem-focused Regional Governance

However and by contrast, this is a Regional Governance System intertwined with a Regional Innovation System. Hence 'Networking', 'Learning' (hopefully or inevitably rapid) and Social Capital should be strong. Leadership may not necessarily be especially strong in such a context because of 'open governance' and 'flat hierarchies'. Bear in mind the fate of the region's main industries may not be a highly prioritised function over which the government has any specific or particular competence or authority, yet it is looked to and interlocuted by industry to help by 'doing something'. So it easily brings key stakeholders of consequence to the problem together for emergency meetings – leading firms, suppliers, industrial and academic research organizations 'from the region'. The region thus rapidly facilitates a conversation and bilateral dialogues. Understanding (rapid learning) of the nature of the 'system shock' is facilitated. Industrial organization is deemed in need of change; more 'open innovation' and outsourcing generally is required, related to 'lean production' norms. Suppliers complain they never did innovation before. A consortium of research associations is proposed as 'trainer' to the suppliers. Funding for 'model projects' is found by the lead Ministry co-funded by industry and research labs. Problem solved, engineering industry saved……for the time being.

6.6.4 Reactive and Proactive Platform Governance

Finally, the model that confronts the propositions of 'platform leadership' most closely as these have evolved over the course of the research is – from the point of view of policy, that concerning Platform Governance.

A Reactive Platform Governance Scenario

Let's walk through a scenario of how reactive plathform governance typically works. Taking innovation as continuing to be the focus and a crisis of the regional economy present, worse that the previous case, whereby foreign competition has virtually wiped out the indigenous industry, an established one with a strong vertical supply-chain from raw materials to final design-intensive products – something of an industrial monoculture in other words.

In this case, all the capabilities listed are in force and it should prove a more resilient administration and policy system than either. Notice in Figure 6.11 the vertical sidebars on 'Changing Techno-economic Paradigm' and 'Global Megatrends' which are under regular if not constant surveillance by the Leadership team. Hence they have some inkling that Transition is 'in the air' and are ready to move in some direction but they cannot fully anticipate which way until it happens. 'Innovation' capability is accordingly high because they are dis-satisfied with the status quo. Networking and Learning capabilities are good because it is an open governance not closed governmental system. Knowledge is distributed but accessible, including, as needed, technical knowledge from beyond the region to at least national level, possibly beyond even that. Social capital is historically strong, not least because of the monoculture and 'Leadership' is at the very least adequate though not overbearing in such a highly networked context.

The task, once the industrial base has been devastated, is to discover whether or not the regional economy has 'related variety' that can aid construction of a platform of activities, path dependent on the old but capable of mutating into something new. To do this, the 'Leadership' sets in train a reactive 'Regional Development Platform Methodology' to identify Regional Development Platforms and Policies that may assist the fulfilment of this Vision.

In this the 'Anticipatory' knowledge of the Changing Techno-economic Paradigm and Global Megatrends work assists because many stakeholders are more or less accultured to them. Expert panels of entrepreneurs and others are called to explore how an innovative industry may form, utilising skills and technologies from the defunct one in the context of such paradigm and megatrends changes. They meet on numerous occasions, reporting back to the regional governance system leadership. Extra expertise from outside

the region in subjects like nanotechnology are called in from national centres of expertise to advise.

A consensus is reached that two megatrend platforms the skills and techniques of the old ‘cluster’ can fit, suitably modernised by innovative knowledge and judicious application of development resources. These are: Clean Technologies; and Healthcare. The regional platform policy is designed accordingly and a new regional economy, drawing upon regionally and globally distributed knowledge bases, interactivity and a coherent methodology for building consensus for taking resource-dependent actions, is designed.

Multi-level governance programmes are identified and targeted to assist in the progress towards building the new regional platforms. These arrive from both national and EU levels and are packaged in ways that seek to maximize their complementarities to what has been designed at regional level. Hence platform policy is a bottom-up approach par excellence.

A Proactive Platform Development Example

Better still is a model that shows capabilities in the proactive dimension. Such a model is found in Bayern (Bavaria) Germany as summarised below and focused upon the platform-building activities of Bayern Innovativ a governance agency for regional development (Fig. 6.12). Here the agency identified key industries that were beneficiaries of cluster policy paid for by Bavaria’s resource windfall when it sold its share in the regional energy supplier. These were cross-tabulated against key technologies to find the inter-disciplinary and inter-industry innovation potentials of ‘related variety’ in the regional economy. Many innovations have ensued from the over 1,000 per year ‘conversations’ facilitated between neighbouring sectors concerning technological applications and resulting innovations. Part of the new platform thinking involved recognition of the importance of enhancing sustainable development as part of a new green vision concerning renewable energy and clean technologies.

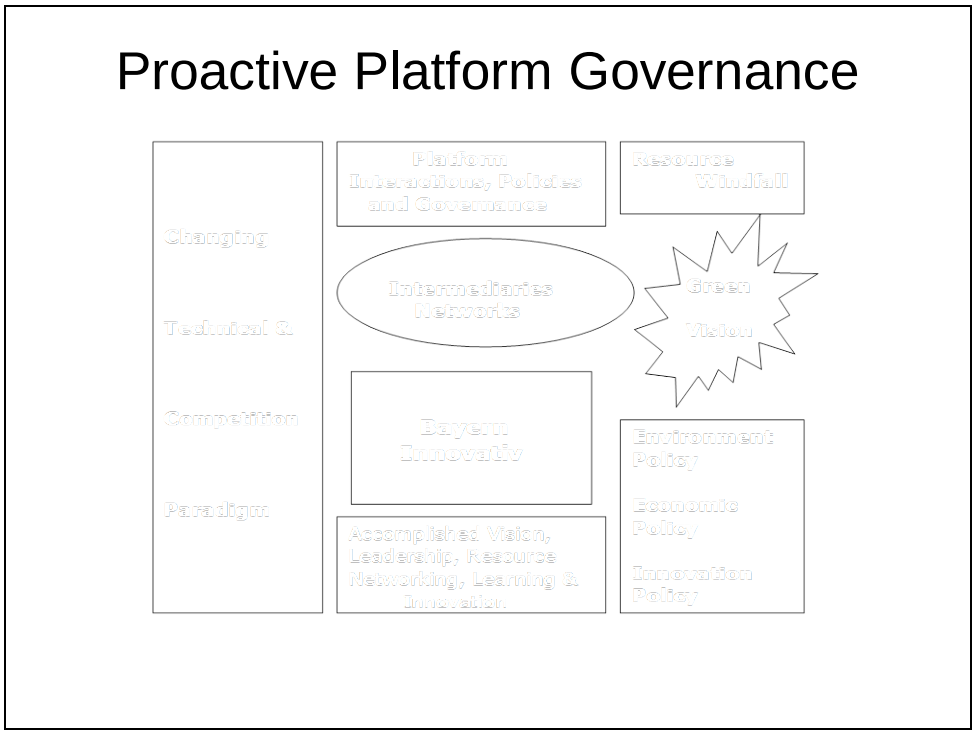

Fig. 6.12. Proactive Platform Governance of Innovation

How does Bayern Innovativ's proactive regional innovation policy work? Fig. 6.12 gives an indication whereby matrix management of potential innovation opportunities occur at intersections between industries and technologies, some having been beneficiaries of earlier cluster programme investments. These are points where conversations among distinct and by no means obviously neighbouring business sectors are facilitated. Accordingly, where these facilitate personal discussion between experts and customers, sustainable cooperation networks are developed. (Note how many elements described in the Governance Model for Transitional Conditions in Figure 6. 9 appear in this real life example of success in Figure 6.12.)

More than 1,000 new co-operations are initiated annually - examples include:

- Laser technology adapted to beam nanoscale droplets onto microarrays for rapid bioanalysis
- Mechatronic systems for car engine management that have been transferred to bus steering systems
- Portable fuel cells that have been applied in automotive electronics

- Plastic injection moulding processes from button manufacturing which have been implemented in automotive plastic components
- A logistics and transport company that has secured a contract with one of the world´s largest Internet suppliers
- A technical textile producer won a contract in medical engineering

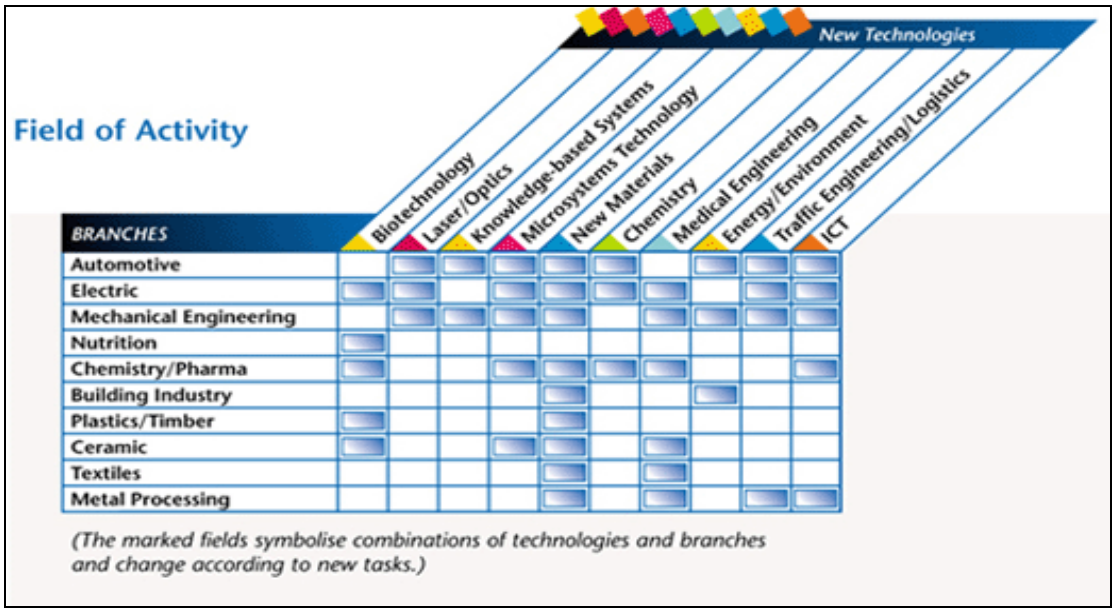

Fig. 6.13. Bayern Innovativ: Technology Platforms (Bayern Innovativ - http://www.bayern-innovativ.de/ 2009)

Hence, Bayern Innovativ initiates business-driven project cooperations across disciplines and branches, taking into account the latest results from the scientific community. Over the past decade the agency has forged new pathways and created a portfolio of cooperation platforms and networks that have generated an extended, sustainable network structure. Both the platforms and the networks are in demand at regional, national and international levels.

6.6.5 Private Platform Governance of Regional Innovation Policy

Finally, it is worth noting that governance of regional innovation policy does not always have to be guided by the public sector as occurred in all the governance styles described above. Particularly with regard to scientific and technological innovation it is not unusual in, for example, the USA or Canada, to see private associations managing innovation. Silicon Valley is the most obvious case but in the rising technology complex at Ottawa, Canada, where Research In Motion produces the Blackberry mobile

communications device, much of the steering of interactions, subsidies and facilities is conducted by The Ottawa Centre for Research and Innovation (OCRI) is a member-based economic development corporation for fostering the advancement of the region's knowledge-based institutions and industries. OCRI delivers its economic development services through a unique partnership with the City of Ottawa, where the City and OCRI, through its members set the strategy and manage the programs that move Ottawa's economy forward. OCRI is a non-profit, partnership organization that operates on an annual budget that comes from a variety of sources including: municipal, federal and provincial government; membership fees; professional development programs; and private sector contributions.

Closer to home, one of Europe's most successful innovation platforms is to be found centred upon the Katholiek Universiteit Leuven (Leuven University) in Flanders region, Belgium. In the 1980s the prestigious microprocessor research institute IMEC (Inter-university Micro-Electronics Centre) was built on campus. It was charged with advancing semiconductor research, development and innovation. The creation of spin-off companies has become an important mechanism for the commercialization of university research results. K.U. Leuven Research & Development actively supports the process of turning a business idea and a technology into a new and promising company. K.U.Leuven has a long spin-off tradition. Over the past 35 years, the growing entrepreneurial culture among researchers, in combination with the support provided by K.U.Leuven Research & Development, has led to the creation of over 70 spin-off companies, having a combined total turnover of well over €400 million and employing more than 2000 people. As noted below and in Fig. 6.13 an inter-connected cluster platform of related variety technology businesses is housed in customised facilities.

A University-driven Cluster Platform in Flanders, Belgium

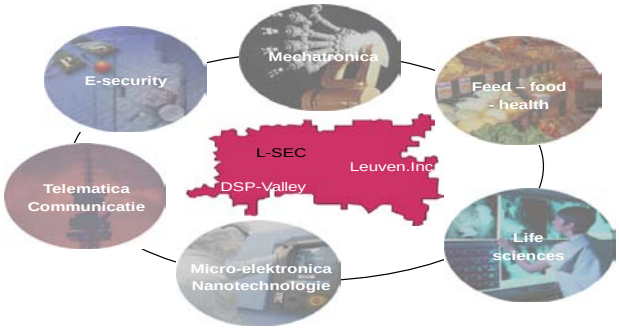

Fig. 6.14. KU Leuven's Private Governance Cluster-Platform Model

K.U.Leuven Research & Development, in close co-operation with the City of Leuven, has created a favourable business climate for high-tech entrepreneurship. In particular, K.U.Leuven R&D is an active partner in the setting up of a number of networking initiatives and technology clusters as well as in the planning, setting up and exploitation of Incubators (3, including one bioincubator), Science Parks (3) and Business Centres (3) into which fully-fledged academic entrepreneurs can move their businesses in the Leuven Region. These activities have resulted in the emergence of six inter-linked clusters that have regular interactions across disciplinary boundaries, receive seed finance from K.U. Leuven Inc., gain connections to technology stock markets locally and worldwide and conduct open innovation contracting with global firms in electronics (e.g. Philips), healthcare bioscience (e.g. Centocor, MedVision) and agro-food biotechnology (e.g. Cargill). In this model of private innovation governance, vision, leadership and networking are extremely strong and entrepreneurial management has ensured ample financial resources of the kind required at different stages of the evolution of technology-based businesses. Moreover, through facilitating cross-fertilizing interactions among industries and 'role model' days when new entrepreneurs learn from successfully established ones, the levels of social capital and practice-based learning at Leuven are also high.

A different, and in one sense narrower but in another sense more complex private associational mode of governance operates in the joint Sweden-Denmark bioregional innovation system of Medicon Valley at Öresund. This is a mainly healthcare biotechnology regional innovation system, but it exists across the international border between Sweden and Denmark. There is no Medicon Valley government but there is a slightly bewildering series of overlapping and interlocking governance mechanisms managed mostly by the bioscientific community or its agents. As Fig. 6.15 shows The Medicon Valley Academy governs the system in question. This is drawn from the membership of the Medicon Valley Alliance.

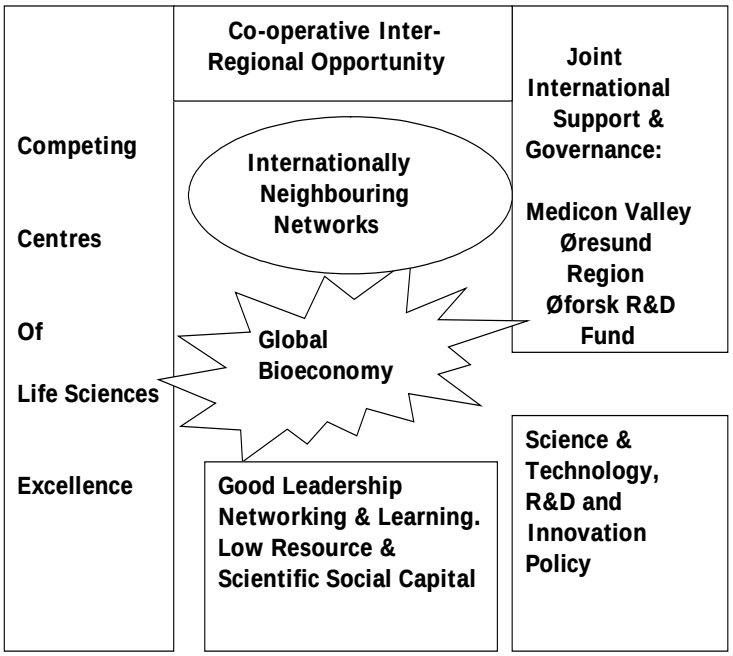

Figure 6.15 Proactive International Platform Governance: MediconValley

The membership of the Medicon valley alliance includes all the relevant and receptive university faculties from institutions on both sides of the Öresund region, university and other important hospitals are among the membership, as are the counties responsible for services, including construction of urban infrastructure in Malmo-Lund on the Swedish side and Greater Copenhagen on the other. A third group of members of the Medicon Valley Alliance are the pharmaceuticals, medical technology and biotechnology companies that exist within the system. In terms of service providers, investors, clinical research organisations, science parks and business specialists can be members of the alliance while bioregions, companies and other relevant organizations can be external members of the network. The Öresund Identity Network manages the 'branding' activities required by the membership and Öforsk funds regional research of relevance to Medicon Valley. Envisioning and networking are two key strengths of note with learning and innovation as core objectives of the consortium.

Hence, it is clear that in complex and rapidly changing contexts a portfolio of governance styles for challenging contexts is available either as a predominant model of transition governance or of a more occasional approach to be taken as circumstances require. In this final main section it is shown that effective governance of innovation can be managed by private governance models. However, good networking capabilities mean that

governmental bodies are welcomed as members, supporters and ambassadors for the specific private model selected – even, as noted in passing, in the Canadian example of OCRI in Ottawa.

6.7 Conclusions

This reflection upon the meaning for VINNOVA of setting our research findings in the context of Co-evolutionary Transitions theory and the need to propose policy models to facilitate transition governance has resulted in at least the outlines at macro and meso levels that are in broad consensus.

Transitions thinking is not that widely understood in our clients' minds except those few that deal with policy responses to the transitions brought about by climate change. To our knowledge, this is the first time it has been used to accommodate transitions outside the 'sustainability' sphere. The larger societal transition is that from a mostly vertically structured Industrial Paradigm to a more horizontally networked Knowledge Paradigm. The latter is as complementary to a 'green' turn in global perspectives on consumption and production as the former is to a 'fossil fuel' perspective in which it has, since the first industrial revolution, been rooted.

There are a series of transition governance categories that are rooted in concrete reality rather than conjectured or conjured up. The main ones are categorised in Fig. 6.16 with 'Proactive Platform Governance embracing

	Issue-based Governance	Problem-focused Governance	Platform Governance	Proactive Platform governance
Key Actors	Governments	Governments, Intermediaries	Intermediaries (Regional Expert Panels)	Intermediaries (Related Variety Aggregators)
Rationality	Issue-specific transition	Transition after system shock	Adaptation to Socio-technical Transition	Early Adaptation to S-T Transition
Instruments	Coordination of public policies and agencies, Issue-specific horizontal policy coordination	Networking, Stakeholder Activation, Limited horizontal policy coordination	Megatrend Analysis, Platform Support Policies, Limited horizontal policy coordination	Megatrend Anticipation, Cluster Interaction, Horizontal Policy Coordination

Fig. 21. Regional Governance Models

the successful Private Governance modes that were outlined. Policy to assist the fulfilment of widespread aspirations for a more 'knowledgeable' and cleaner mode of production has to undergo changes, indeed a transition, if it is not to prove an obstacle. It needs to be 'joined-up', 'governance-minded' and 'flexible' in meeting the distinctive needs of different 'floorboards' in the 'platforms' of regional economic development it seeks to sustain, assist, or - at the extreme – co-design. Each of the models discussed in Sections 8-11 is, to repeat, actually existing rather than imagined. The final step for is to examine an array of the policy instruments thought likely to be useful in the implementation styles of any of the three discussed, or more.

It is probably the 'Platform Governance' model that is likely to suit the interests of VINNOVA best. Possibly the Bayern Innovativ model is the most interesting for its platform 'cross-fertilization' design intent. It is likely that private governance, while interesting, will only achieve this kind of synergy among clusters across a narrow range of science-based, high technology industries whereas the Bayern Innovativ model is more comprehensive. It may be worth considering a refinement of the Bayern Innovativ model however. It has been commented that it is a rather exclusive model in which funding support and main focus is upon Bavarian firms. This is questionable in terms of EU state-aids principles but also

perhaps unduly narrow in a Swedish context. It should be considered whether a Matrix Model of Proactive Platform Governance operated in Sweden should be inclusive towards overseas firms that are members of innovation networks, something which applies in the hitherto unexplored regional platform of Lower Austria, for example. Whether these findings are a useful guide to the future of VINNOVA innovation governance in Swedish regions remains an open question.